This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

THE VOYAGE OF THE VEGA

ROUND

ASIA AND EUROPE.

VOL. II.

Theodore Roosevelt.

VOYAGE OF THE VEGA

ASIA AND EUROPE

WITH A HISTORICAL [illegible]
[illegible] JOURNEYS [illegible]
[illegible]

A. E. NORDENSKIOLD

TRANSLATED BY ALEXAN[illegible]

[illegible]

IN TWO VOLUMES. VOL. II

London
MACMILLAN AND CO.
18[illegible]

THE

VOYAGE OF THE VEGA

ROUND

ASIA AND EUROPE

WITH A HISTORICAL REVIEW
OF PREVIOUS JOURNEYS ALONG THE NORTH COAST OF THE
OLD WORLD

BY

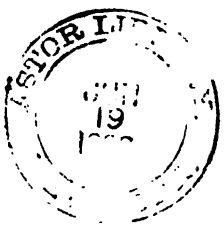
A. E. NORDENSKIÖLD

TRANSLATED BY ALEXANDER LESLIE

WITH FIVE STEEL PORTRAITS, NUMEROUS MAPS, AND ILLUSTRATIONS

IN TWO VOLUMES—VOL. II

London
MACMILLAN AND CO.
1881



NEW YORK
PUBLIC
LIBRARY

CONTENTS OF VOL. II.

CHAPTER XI.

Hope of release at the new year—Bove's excursion to the open water—Mild weather and renewed severe cold — Mercury frozen — Popular lectures—Brusewitz's excursion to Najtskaj—Another despatch of letters home—The natives' accounts of the state of the ice on the coast of Chukch Land—The Chukches carry on traffic between Arctic America and Siberia—Excursions in the neighbourhood of winter quarters—The weather during spring—The melting of the snow—The aurora—The arrival of the migratory birds—The animal world of Chukch Land—Noah Elisej's relief expedition—A remarkable fish — The country clear of snow — Release—The North-East Passage achieved . . . . . *Pages* 1—69

CHAPTER XII.

The history, *physique*, disposition, and manners of the Chukches *Pages* 70—147

CHAPTER XIII.

The development of our knowledge of the north coast of Asia—Herodotus—Strabo—Pliny—Marco Polo—Herbertstein's map—The conquest of Siberia by the Russians—Deschnev's voyages—Coast navigation between the Lena and the Kolyma—Accounts of islands in the Polar Sea and old voyages to them—The discovery of Kamchatka—The navigation of the Sea of Okotsk is opened by Swedish prisoners-of-war—The Great Northern Expedition—Behring—Schalaurov — Andreyev's Land — The New Siberian islands—Hedenström's expeditions—Anjou and Wrangel—Voyages from Behring's Straits westward—Fictitious Polar voyages . . . *Pages* 148—217

CHAPTER XIV.

Passage through Behring's Straits—Arrival at Nunamo—Scarce species of seal—Rich vegetation—Passage to America—State of the ice—Port Clarence—The Eskimo—Return to Asia—Konyam Bay—Natural conditions there—The ice breaks up in the interior of Konyam Bay—St. Lawrence Island—Preceding visits to the Island—Departure to Behring Island . . *Pages* 218—256

CHAPTER XV.

The position of Behring Island—Its inhabitants—The discovery of the Island by Behring—Behring's death—Steller—The former and present fauna on the Island: foxes, sea-otters, sea-cows, sea-lions, and sea-bears—Collection of bones of the Rhytina—Visit to a "rookery"—Torporkoff Island—Alexander Dubovski—Voyage to Yokohama—Lightning stroke.

Pages 257—295

CHAPTER XVI.

Arrival at Yokohama—A Telegram sent to Europe—The stranding of the Steamer *A. E. Nordenskiöld*—*Fêtes* in Japan—The Minister of Marine, Kawamura—Prince Kito-Shira-Kava—Audience of the Mikado—Graves of the Shoguns—Imperial Garden at Tokio—The Exhibition there—Visit to Enoshima—Japanese Manners and Customs—Thunberg and Kämpfer . *Pages* 296—326

CHAPTER XVII.

Excursion to Asamayama—The Nakasendo road—Takasaki—Difficulty of obtaining Quarters for the Night—The Baths at Ikaho—Massage in Japan—Swedish matches—Travelling in *Kago*—Savavatari—Criminals—Kusatsu—The Hot Springs and their healing power—Rest at Rokurigahara—The Summit of Asamayama—The Descent—Journey over Usui-toge—Japanese Actors—Pictures of Japanese Folk-life—Return to Yokohama.

Pages 327—361

CHAPTER XVIII.

Farewell dinner at Yokohama—The Chinese in Japan—Voyage to Kobe—Purchase of Japanese Books—Journey by rail to Kioto—Biwa Lake and the Legend of its Origin—Dredging there—Japanese Dancing-Girls—Kioto—The Imperial Palace—Temples—Swords and Sword-bearers—Shintoism and Buddhism—The Porcelain Manufacture—Japanese Poetry—Feast in a Buddhist Temple—Sailing across the Inland Sea of Japan—Landing at Hirosami and Shimonoseki—Nagasaki—Excursion to Mogi—Collection of Fossil Plants—Departure from Japan . . . . . *Pages* 362—395

CHAPTER XIX.

Hong Kong and Canton—Stone-polishing Establishments at Canton—Political Relations in an English Colony—Treatment of the Natives—Voyage to Labuan—Coal Mines there—Excursion to the shore of Borneo—Malay Villages—Singapore—Voyage to Ceylon—Point de Galle—The Gem Mines at Ratnapoora—Visit to a Temple—Purchase of Manuscripts—The Population of Ceylon—Dr. Almquist's Excursion to the Interior of the Island.
Pages 396—436

CHAPTER XX.

The Journey Home—Christmas, 1879—Aden—Suez—Cairo—Excursion to the Pyramids and the Mokattam Mountains—Petrified Tree-stems—The Suez Canal—Landing on Sicily by night—Naples—Rome—The Members of the Expedition separate—Lisbon—England—Paris—Copenhagen—Festive Entry into Stockholm—*Fêtes* there—Conclusion . . . *Pages* 439—464

PORTRAITS.

Engraved on Steel by G. J. Stodart, of London.

Adolf Erik Nordenskiöld . . . . . *To face Title-page.*

Louis Palander . . . . . ,, *Page* 68

LITHOGRAPHED MAPS.

9. Herbertstein's Map of Russia, 1550 (photolithographic facsimile). . 156

10. Map of the North Coast of the Old World from Norway to Behring's Straits, with the track of the *Vega*, constructed from old and recent sources, and from observations made during the Voyage of the *Vega*, by N. Selander, Captain in the General Staff . . 464

LIST OF WOOD-CUTS IN VOL. II.

The Wood-cuts, when not otherwise stated below, were engraved at Herr Wilhelm Meyer's Xylographic Institute in Stockholm.

		PAGE
1.	Chukches	1
2.	The Encampment Pitlekaj abandoned by its Inhabitants on the 18th February, 1879	4
3.	Notti and his Wife Aitanga	8
4.	Map of the Region round the *Vega's* Winter Quarters	16
5.	The Sleeping Chamber in a Chukch Tent	21
6.	Chukch Lamps	22
7.	Section of a Chukch Lamp	23
8.	Chukch Shaman Drum	24
9.	The Coast between Padljonna and Enjurmi	25
10.	Bracelet of Copper	26
11.	The North End of Idlidlja Island	27
12.	The Common Aurora-Arc at the *Vega's* Winter Quarters	38
13.	Aurora at the *Vega's* Winter Quarters, 3rd March, 1879, at 9 p.m.	39
14.	Double Aurora-Arcs seen 20th March, 1879, at 9.30 P.M.	39
15.	Elliptic Aurora seen 21st March, 1879, at 2.15 A.M.	39
16.	Elliptic Aurora seen 21st March, 1879, at 3 A.M.	39
17.	Song-Birds in the Rigging of the Vega, June, 1879	41
18.	Spoon-billed Sand-piper from Chukch Land (*Eurynorhynchus pygmæus*, L.)	43

PAGE

19. Marmots from Chukch Land 45
20. *Stegocephalus Kessleri*, Sturb. 48
21. *Sabinea septemcarinata*, Sabine 48
22. *Acanthostephia Malmgreni*, Goes 49
23. *Ophiocten sericeum*, Lutken 49
24. Noah Elisej 51
25. Beetles from Pitlekaj. 55
26. Phosphorescent Crustacea from Mussel Bay 56
27. Keitinacka 57
28. Dog-Fish from the Chukch Peninsula (*Dallia delicatissima*, Smith) . 59
29. Crab from the Sea North of Behring's Straits (*Chionoecetes opilio*, Kroyer) 62
30. Tree from Pitlekaj (*Salix Arctica*, Pallas) 65
31. Typical Chukch Faces 84
32. „ „ 85
33. Plan of a Chukch Grave 89
34. Tent Frame at Pitlekaj 90
35. Chukch Oar 93
36. Dog Shoe 96
37. Chukch Face-Tattooing 100
38. Chukch Children 101
39. Snow-Shoes 102
40. An Aino-Man skating after a Reindeer 103
41. Hunting Cup and Snow-scraper 104
42. Chukch Weapons and Hunting Implements 105
43. Chukch Bow and Quiver 106
44. Chukch Arrows 107
45. Stone Hammers and Anvil for Crushing Bones 112
46. Chukch Implements 117
47. Fire-Drill 121
48. Ice Mattocks 123
49. Human Figures 127

PAGE

50. Musical Instruments 130
51. Drawings made by the Chukches . . . . . 132—133
52. Chukch Buckles and Hooks of Ivory 136
53. Chukch Bone Carvings 139
54. Chukch Doll 141
55. Chukch Bone Carvings . . . . . 142—143
56. Chukch Bone Carvings of Birds 145
57. Map of the World, said to be of the Tenth Century 151
58. Map of the World showing Asia to be continuous with Africa . . 152
59. Map of the World after Fra Mauro, from the middle of the Fifteenth Century 155
60. Map of Asia from an Atlas published by the Russian Academy of Sciences in 1737 177
61. Peter Feodorovitsch Anjou 207
62. Ferdinand von Wrangel 208
63. Seal from the Behring Sea, *Histriophoca fasciata*, Zimm . . . 219
64. *Draba Alpina*, L., from St. Lawrence Bay 224
65. Hunting Implements at Port Clarence. 229
66. Eskimo Family at Port Clarence. 230
67. Eskimo from Port Clarence. 231
68. Eskimo from Port Clarence. 232
69. Eskimo Fishing Implements, &c. 234
70. Eskimo Bone Carvings, &c. 237
71. Eskimo Grave 239
72. Animal Figure from an Eskimo Grave. 240
73. Ethnographical Objects from Port Clarence. 241
74. Shell from Behring's Straits, *Fusus deformis*, Reeve 243
75. Diagram showing the temperature and depth of the water at Behring's Straits between Port Clarence and Senjavin Sound, by G. Bove . 244
76. Konyam Bay 247
77. Tattooing Patterns from St. Lawrence Island 251
78. Tattooed Woman from St. Lawrence Island 252

PAGE

79. The Colony on Behring Island 259
80. The Colony on Copper Island 261
81. Natives of Behring Island 263
82. Skeleton of Rhytina, shown at the *Vega* Exhibition at the Royal Palace, Stockholm 279
83. Original Drawings of the Rhytina 279
84. Reconstructed Form of the Sea-Cow 280
85. Sea Bears, Male, Female, and Young 282
86. "Seal Rookery" on St. Paul's Island, one of the Pribyloo Islands . 285
87. Slaughter of Sea-Bears 288
88. Sea-Bears on their way to "the Rookeries" 289
89. Alga from the shore of Behring Island, *Thalassiophyllum Clathrus*, Post. and Rupr. 293
90. Fusugama 299
91. The steamer *A. E. Nordenskiöld* stranded on the East Coast of Yezo . . 301
92. Kawamura Sumiyashi, Japanese Minister of Marine 302
93. The First Medal which was struck as a Memorial of the Voyage of the *Vega* 306
94. The First Medal which was struck as a Memorial of the Voyage of the *Vega* 307
95. Stone Lantern and Stone Monument in a Japanese Temple Court. . 311
96. Japanese House in Tokio 312
97. Japanese Lady at her Toilet 314
98. A Jinrikisha 317
99. Japanese Bedroom 319
100. Tobacco-Smokers, Japanese Drawing 322
101. Ito-Keske, a Japanese Editor of Thunberg's Writings . . . 324
102. Monument to Thunberg and Kaempfer at Nagasaki 325
103. Japanese Kago 337
104. Japanese Wrestlers 339
105. Japanese Bridge, after a Japanese drawing 340
106. Japanese Mountain Landscape, drawn by Prof. P. D. Holm . . 341
107. Inn at Kusatsu, drawn by R. Haglund 344

PAGE

108. Bath at Kusatsu, Japanese drawing, drawn by O. Sörling . . . 347
109. Japanese Landscape, drawn by Prof. P. D. Holm 353
110. Burden-bearers on a Japanese Road, Japanese drawing, drawn by O. Sörling 356
111. Japanese Shop, drawn by V. Andrén. 367
112. Japanese Court Dress, drawn by ditto 373
113. Noble in Antique Dress, drawn by ditto 374
114. Buddhist Priest, drawn by ditto 375
115. A Samurai, drawn by ditto 376
116. Gate across the Road to a Shinto Temple, drawn by Prof. P. D. Holm 378
117. Buddhist Temple at Kobe, drawn by ditto. 379
118. Rio-San's Seal 383
119. Burying-Place at Kioto, drawn by Prof. P. D. Holm 385
120. Entrance to Nagasaki, drawn by R. Haglund 388
121. Fossil Plants from Mogi—1, 2, Beech Leaves (*Fagus ferruginea*, Ait., var. *pliocena*, Nath.), drawn by M. Westergren 393
122. Fossil Plant from Mogi—3, Maple Leaf (*Acer Mono*, Max., var. *pliocena*, Nath.) 393
123. Fossil Plant from Mogi—Leaf of *Zelkova Keakii*, Sieb., var. *pliocena*, Nath., drawn by M. Westergren 394
124. Gem Diggings at Ratnapoora, drawn by R. Haglund 419
125. Statues in a Temple in Ceylon, drawn by ditto. 429
126. A Country Place in Ceylon, drawn by V. Andrén 431
127. Highland View from the Interior of Ceylon, drawn by R. Haglund . 434
128. The Scientific Men of the *Vega*. 437
129. The Officers of the *Vega* 451
130. The Crew of the *Vega*, drawn by R. Widing 459
131. The Entrance of the *Vega* into Stockholm on the 24th April, 1880, drawn by R. Haglund 463
132. The *Vega* moored off the Royal Palace, Stockholm, drawn by ditto . 466

ERRATA.

Page 22, under wood-cut, *for* "*a*. Of wood. *b*. Of stone," *read* "*a*. Wooden cup to place under the lamp. *b*. Lamp of burned clay."
Page 41, line 6 from foot, *for* "beginning of May," *read* "middle of June."
Page 41, under wood-cut, *for* "May," *read* "June."
Page 44, line 19, *for* "*mountain*," *read* "*Arctic*."
Page 54, last line, *for* "contracteta," *read* "contracta."
Page 68, last line, *for* "Natural size," *read* "Half the natural size."
Page 98, lines 9 and 12 from foot, *for* "moccassin," *read* "moccasin."
Page 100, line 2 from foot, *for* "moccassin," *read* "moccasin."
Page 227, line 11 from foot, *for* "American," *read* "Asiatic."

THE VOYAGE OF THE VEGA

ROUND

ASIA AND EUROPE.

VOL. II.

CHAPTER XI.

Hope of release at the new year—Bove's excursion to the open water—Mild weather and renewed severe cold—Mercury frozen—Popular lectures—Brusewitz's excursion to Najtskaj—Another despatch of letters home—The natives' accounts of the state of the ice on the coast of Chukch Land—The Chukches carry on traffic between Arctic America and Siberia—Excursions in the neighbourhood of winter quarters—The weather during spring—The melting of the snow—The aurora—The arrival of the migratory birds—The animal world of Chukch Land—Noah Elisej's relief expedition—A remarkable fish—The country clear of snow—Release—The North-East Passage achieved.

THE new year came in with a faint hope of release. For since the north and north-west winds that had prevailed almost constantly towards the close of December had given place to winds from the east and south, considerable "clearings" were again formed out at sea, and the Chukches again began to say that

the ice would drift away, so that the vessel would be able to continue her voyage; a prediction which they always ended with a declaration, expressed both by words and gestures, that they would then bitterly lament, which they would also have had sufficient reason to do, considering the very friendly way in which they were treated by all on board the *Vega*, both officers and men.

On New Year's Day, in order to see the state of the ice farther out to sea, Lieut. Bove, accompanied by the hunter Johnsen, again made an excursion to the open water. Of this he gave the following account:—

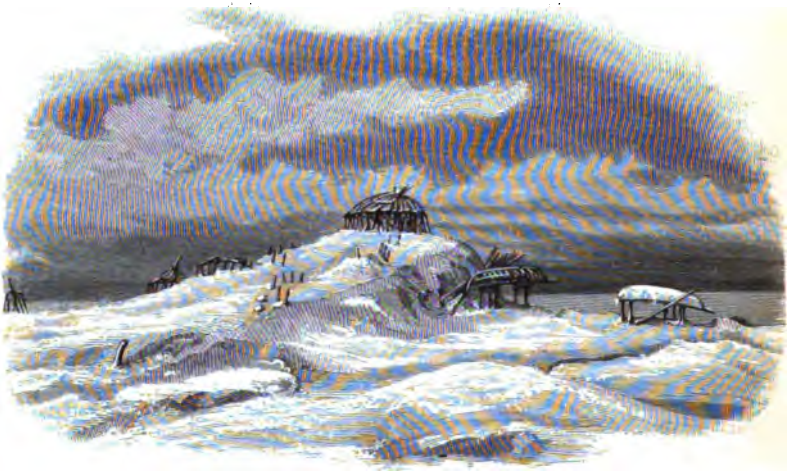
"I left the vessel on the forenoon of 1st January and reached the open water after four hours' steady walking. The deep loose snow made walking very fatiguing, and three rows of *torosses* also contributed to this, mainly in consequence of the often snow-covered cracks, which crossed the ice-sheet in their neighbourhood. One of the *torosses* was ten metres high. The size of the blocks of ice, which were here heaped on each other, showed how powerful the forces were which had caused the formation of the *torosses*. These ice ramparts now afford a much needed protection to the *Vega's* winter haven. About halfway between the open water and the vessel the way was crossed by cracks running from east to west, and clearly indicating that the opening in the ice would have extended to the distance of a kilometre from the vessel, if the violent storm in December had lasted twelve hours longer. The *Vega* would thereby have been in great danger. The edge of the ice towards the open water was evenly cut, as with an immense knife, and was so strong that one could walk along it as on a rock. Even from the top of a five-metre-high ice-rampart no boundary of the open water could be seen to the north-east or north. Partly from this, partly from the extension of the water-sky in this direction, I draw the conclusion that the breadth of the open water was at least thirty-five kilometres. The "clearing" was bounded on the east by an ice-rampart running north, which at a distance of nine or ten kilometres appeared to bend to the east. Possibly farther to the east beyond this ice-rampart there was another open water basin. The depth at the edge of the ice was twenty-one metres, the temperature of the water 2° C. The water ran at a considerable speed right out from the

coast (*i.e.* from S.S.E.). As it ran here nearly in a straight line, the current may have been a tidal one. The open water swarmed with seals, according to Johnsen both bearded and rough. Neither Polar bears, walrusses, nor birds were seen."

Lieut. Bove's report confirmed me in my supposition that the open water, as towards the end of January 1873 at Mussel Bay, might possibly extend as far as our anchorage and open for us the way to Behring's Straits, in which case we could not refrain from continuing our voyage, however unpleasant and dangerous it might be at this season of the year. The Chukches also declared repeatedly that the open water in January would continue for a considerable time, and in expectation of this got their simple fishing implements ready. But both they and we were disappointed in our expectation. The *Vega's* ice-fetters remained undisturbed, and the blue border at the horizon grew less and again disappeared. This caused so great a want of food, and above all of train oil, among the natives, that all the inhabitants of Pitlekaj, the village nearest to us, were compelled to remove to the eastward, notwithstanding that in order to mitigate the scarcity a considerable quantity of food was served out daily at the vessel.

It appears, however, as if an actual experience from the preceding year had been the ground of the Chukches' weather prediction. For on the 6th February a south-east wind began to blow, and the severe cold at once ceased. The temperature rose for a few hours to and even above the freezing-point. A water-sky was again formed along the horizon of the ice from north-east to north, and from the heights at the coast there was seen an extensive opening in the ice-fields, which a little east of Irgunnuk nearly reached the shore. Some kilometres farther east even the shore itself was free of ice, and from the hills our sailors thought they saw a heavy sea in the blue water-border which bounded the circle of vision. If this was not an illusion,

caused by the unequal heating and oscillatory motion of the lower stratum of the atmosphere, the open water may have been of great extent. Perhaps the statement of the natives was correct, that it extended as far as Behring's Straits. But we could not now place complete reliance on their statements, since we had rewarded with extra treating some predictions, relating



THE ENCAMPMENT PITLEKAJ ABANDONED BY ITS INHABITANTS ON THE 18TH FEBRUARY, 1879.

(After a drawing by O. Nordquist.)

to ice and weather, that were favourable to us. Even between the vessel's anchorage and the land various cracks had been formed, through which the sea water had forced its way under the snow, and in which some of us got cold foot or leg baths during our walks to and from the land.

The Chukches at Irgunnuk were now successful in killing a Polar bear and seventy seals, of which some were ostentatiously set up in rows, along with frozen slices of blubber, along the outer walls of the tents, and others were laid down in the

blubber cellars, which were soon filled to overflowing. At Yinretlen, the encampment nearer us, the hunters on the other hand had obtained only eight seals. Gladness and want of care for the morrow at all events prevailed here also, and our skin-clad friends availed themselves of the opportunity to exhibit a self-satisfied disdain of the simple provisions from the *Vega*, which the day before they had begged for with gestures so pitiful, and on which they must, in a day or two, again depend. The children, who had fallen off during recent weeks, if not in comparison with European children, at least with well-fed Chukch ones, began speedily to regain their former condition, and likewise the older people. Begging ceased for some days, but the vessel's deck still formed a favourite rendezvous for crowds of men, women, and children. Many passed here the greater part of the day, cheerful and gay in a temperature of −40° C, gossiped, helped a little, but always only a little, at the work on board, and so on. The mild weather, the prospect of our getting free, and of an abundant fishing for the Chukches, however, soon ceased. The temperature again sank below the freezing-point, that is *of mercury*, and the sea froze so far out from the shore that the Chukches could no longer carry on any fishing. Instead we saw them one morning come marching, like prisoners on an Egyptian or Assyrian monument, in goose-march over the ice toward the vessel, each with a burden on his shoulder, of whose true nature, while they were at a distance, we endeavoured in vain to form a guess. It was pieces of ice, not particularly large, which they, self-satisfied, cheerful and happy at their new hit, handed over to the cook to get from him in return some of the *kauka* (food) they some days before had despised.

The first time the temperature of the air sank under the freezing-point of mercury, was in January. It now became necessary to use instead of the mercury the spirit thermometers, which in expectation of the severe cold had been long ago hung

up in the thermometer case. When mercury freezes in a common thermometer, it contracts so much that the column of mercury suddenly sinks in the tube, or if it is short, goes wholly into the ball. The position of the column is therefore no measure of the actual degree of cold when the freezing takes place. The reading of $-89°$, or even of $-150°$, which at a time when it was not yet known that mercury could at a low temperature assume the solid form, was made on a mercurial thermometer in the north of Sweden,[1] and which at the time occasioned various discussions and doubts as to the trustworthiness of the observer, was certainly quite correct, and may be repeated at any time by cooling mercury under its freezing-point in a thermometer of sufficient length divided into degrees under 0°. The freezing of mercury[2] takes place from below upwards, the frozen metal as being heavier sinking down in that portion which is still fluid. If when it is half frozen the fluid be poured away from the frozen portion, we obtain groups of crystals, composed of small octohedrons, grouped together by the edges of the cube. None of our mercurial thermometers suffered any damage, nor was there any alteration of the position of the freezing-point in them from the mercury having frozen in them and again become fluid.

[1] And. Hellant, *Anmärkningar om en helt ovanlig köld i Torne* (*Remarks on a Quite Unusual Cold in Torne*), Vet.-akad. Handl. 1759, p. 314, and 1760, p. 312. In the latter paper Hellant himself shows that the column of mercury in a strongly cooled thermometer for a few moments *sinks farther* when the ball is rapidly heated. This is caused by the expansion of the glass when it is warmed before the heat has had time to communicate itself to the quicksilver in the ball, and therefore of course can happen only at a temperature above the freezing-point of mercury.

[2] That mercury solidifies in cold was discovered by some academicians in St. Petersburg on the 25th December, 1759, and caused at the time a great sensation, because by this discovery various erroneous ideas were rooted out which the chemists had inherited from the alchemists, and which were based on the supposed property of mercury of being at the same time a metal and a fluid.

During the severe cold the ice naturally became thicker and thicker; and by the continual northerly winds still higher *torosses* were heaped up round the vessel, and larger and larger snow masses were collected between it and the land, and on the heights along the coast. All hopes or fears of an early release were again given up, and a perceptible dullness began to make itself felt after the bustle and festivities of the Christmas holidays. Instead there was now arranged a series of popular lectures which were held in the lower deck, and treated of the history of the North-East Passage, the first circumnavigations of the globe, the Austrian-Hungarian Expedition, the changes of the earth's surface, the origin of man, the importance of the leaf to the plants, &c. It became both for the officers and scientific men and the crew a little interruption to the monotony of the Arctic winter life, and the lecturer could always be certain of finding his little auditory all present and highly interested. Some slight attempts at musical evening entertainments were also made, but these failed for want of musical instruments and musical gifts among the *Vega* men. We had among us no suitable director of theatrical representations after the English-Arctic pattern, and even if we had had, I fear that the director would have found it very difficult to gather together the dramatic talents requisite for his entertainment.

On the 17th February Lieutenant Brusewitz made an excursion to Najtskaj, of which he gives the following account:—

"I and Notti left the vessel in the afternoon, and after two hours came to Rirajtinop, Notti's home; where we passed the night, together with his three younger brothers and an invalid sister, who all lived in the same tent-chamber. Immediately after our arrival one of the brothers began to get the dog-harness and sleigh ready for the following day's journey, while the rest of us went into the interior of the tent, where the invalid sister lay with her clothes off, but wrapt in reindeer skins. She took

charge of two train-oil lamps, over which hung two cooking vessels, one formerly a preserve tin, and the other a bucket of tinned iron. One of the brothers came in with a tray, on which was placed a piece of seal blubber, together with frozen vegetables, principally willow leaves. The blubber was cut into small square pieces about the size of the thumb, after which one of the brothers gave the sister a large portion both of the blubber and vegetables. The food was then served out to the others. Every piece of blubber was carefully imbedded in vegetables before it was eaten. When the vegetables were

NOTTI AND HIS WIFE AITANGA.
(After photographs by L. Palander)

finished there was still some blubber, which was given to the dogs that lay in the outer tent. After this the boiled spare-ribs of a seal were partaken of, and finally a sort of soup, probably made from seal's blood. The sister had a first and special helping of these dishes. I also got an offer of every dish, and it did not appear to cause any offence that I did not accept the offer. After the close of the meal the cooking vessels were set down, the "pesks" taken off, and some reindeer skins taken down from the roof and spread out. The older brothers lighted their pipes, and the younger lay down to sleep. I was shown to one of the side places in the tent, evidently Notti's own. One of the

lamps was extinguished, after which all slept. During the night the girl complained several times, when one of the brothers always rose and attended to her. At six in the morning I wakened the party and reminded them of our journey. All rose immediately. Dressing proceeded slowly, because much attention was given to the foot covering. No food was produced, but all appeared quite pleased when I gave them of my stock, which consisted of bread and some preserved beef-steaks. Immediately after breakfast four dogs were harnessed to the sleigh, with which Notti and I continued our journey to Najtskaj, I riding and he running alongside the sleigh. At Irgunnuk, a Chukch village about an English mile east of Rirajtinop, a short stay was made in order to try to borrow some dogs, but without success. We continued our journey along the shore, and at 10 o'clock A.M. arrived at Najtskaj, which is from fifteen to eighteen kilometres E.S.E. from Irgunnuk. Here we were received by most of our former neighbours, the inhabitants of Pitlekaj. Of the thirteen tents of the village the five westernmost were occupied by the former population of Pitlekaj, while the eight lying more to the eastward were inhabited by other Chukches. The Pitlekaj people had not pitched their common large tents, but such as were of inconsiderable size or small ones fastened close together. In all the tents here, as at Rirajtinop and Irgunnuk, there was much blubber laid up; we saw pieces of seal and whole seals piled up before the tents, and on the way to Najtskaj we met several sledges loaded with seals, on their way to Pidlin. At Najtskaj I went out hunting accompanied by a Chukch. We started eight hares, but did not succeed in getting within range of them. A red fox was seen at a great distance but neither ptarmigan nor traces of them could be discovered. At two in the afternoon I returned to Irgunnuk and there got another sleigh drawn by ten dogs, with which I soon reached the vessel."

On the 20th February three large Chukch sledges laden with goods and drawn by sixteen to twenty dogs stopped at the *Vega*. They said they came from the eastward, and were on their way to the market in the neighbourhood of Nischni Kolymsk. I again by way of experiment sent with them home-letters, for which, as they declined to take money, I gave them as postage three bottles of rum and abundant entertainment for

men and dogs. In consideration of this payment they bound themselves faithfully to execute their commission and promised to return in May. And they kept their word. For on the 8th and 9th May a large number of sledges heavily laden with reindeer skins and drawn by many dogs, passed along the coast from west to east. Of course all rested at the *Vega*, the only house of entertainment on the coast of the Asiatic Polar Sea, considering it as a matter of indisputable right, that they should in return for a little talk and gossip obtain food and "ram." Very eagerly they now informed us that a letter would come with another dog train that might be expected in a few hours. This was for us a very great piece of news, the importance of which none can understand who has never hungered for months for news from home, from the home-land and the home-world. Eager to know if we had actually to expect *a post* from Europe, we asked them how large the packet was. "Very large" was the answer, and the "ram" was of course measured accordingly. But when at last the letter came it was found to be only an exceedingly short note from some of the Russian officials at Kolyma, informing me that our letters had reached him on the $\frac{\text{4th April}}{\text{23rd March,}}$ and had been immediately sent by express to Yakutsk. Thence they were sent on by post, reaching Irkutsk on the $\frac{\text{26th}}{\text{14th}}$ May, and Sweden on the 2nd August.

During autumn and midwinter the sunshine was not of course strong and continuous enough to be painful to the eyes, but in February the light from the snow-clouds and the snow-drifts began to be troublesome enough. On the 22nd February accordingly snow-spectacles were distributed to all the men, an indispensable precaution, as I have before stated, in Arctic journeys. Many of the Chukches were also attacked with snow-blindness somewhat later in the season, and were very desirous of obtaining from us blue-coloured spectacles. Johnsen even stated that one of the hares he shot was evidently snow-blind.

On the evening of the 22th February there burst upon us

a storm with drifting snow and a cold of −36°. To be out in such weather is not good even for a Chukch dog. Of this we had confirmation the next day, when a Chukch who had lost his way came on board, carrying a dog, frozen stiff, by the backbone, like a dead hare. He had with his dog gone astray on the ice and lain out, without eating anything, in a snow-drift for the night. The master himself had suffered nothing, he was only hungry, the dog on the other hand scarcely showed any sign of life. Both were naturally treated on board the *Vega* with great commiseration and kindness. They were taken to the 'tween-decks, where neither Chukches nor Chukch dogs were otherwise admitted; for the man an abundant meal was served of what we believed he would relish best, and he was then allowed, probably for the first time in his life, to sleep if not under a sooty, at least under a wooden roof. The dog was for hours carefully subjected to massage, with the result that he came to life again, which struck us, and, as it appeared, not least the Chukch himself, as something wonderful.

In the beginning of March there passed us a large number of sledges laden with reindeer skins, and drawn by eight to ten dogs each. Every sledge had a driver, and as usual the women took no part in the journey. These trains were on a commercial journey from Irkaipij to Päk at Behring's Straits. We found among the foremen many of our acquaintances from the preceding autumn, and I need not say that this gave occasion to a special entertainment, for the people, bread, a little spirits, soup, some sugar, and tobacco, for the dogs, pemmican. Conversation during such visits became very lively, and went on with little hindrance, since two of us were now somewhat at home in the Chukch language. For if I except two men, Menka and Noah Elisej, who could talk exceedingly defective Russian, there was not one of the reindeer or dog-foremen travelling past who could speak any European language, and notwithstanding this they all carry on an active commerce with the Russians. But the

Chukch is proud enough to require that his own language shall prevail in all international commerce in the north-east of Asia, and his neighbours find their advantage in this.

During the course of the winter, Lieutenant Nordquist collected from the Chukch foremen coming from a distance who travelled past, information regarding the state of the ice between Chaun Bay and Behring's Straits at different seasons of the year. Considering the immense importance of the question, even in a purely practical point of view, I shall quote verbatim the statements which he thus collected.

Statements regarding the state of the ice on the coast between Cape Yakan and Behring's Straits by Chukches living there.

"1. A Chukch from Yekanenmitschikan, near Cape Yakan, said that it is usual for open water to be there the whole summer.

"2. A Chukch from Kinmankau, which lies a little to the west of Cape Yakan, said the same.

"3. A Chukch from Yakan stated that the sea there becomes free of ice in the end of May or beginning of June. On the other hand it is never open in winter.

"4. Tatan from Yakan stated that the sea there is open from the end of May or beginning of June to the latter part of September or beginning of October, when the ice begins to drift towards the land.

"5. Rikkion from Vankarema said that the sea there is covered with ice in winter, but open in summer.

"6. A reindeer Chukch, Rotschitlen, who lives about twelve English miles from the *Vega's* winter quarters, said that Kolyutschin Bay, by the Chukches called Pidlin, is clear of ice the whole summer.

"7. Urtridlin from Kolyutschin said that neither at that island nor in Kolyutschin Bay is there any ice in summer.

"8. Ranau, from Yinretlen, also said that Kolyutschin Bay is always open in summer.

"9. Ettiu, from the village Nettej, between Irgunnuk and Behring's Straits, stated that the sea at Nettej is open in summer, independently of the wind, in winter only when the wind is southerly.

"10. Vankatte, from Nettej, stated that the sea there becomes

open during the month "Tautinyadlin," that is, the latter part of May and the beginning of June, and is again covered with ice during the month "Kutscshkau," or October and November.

"11. Kepljeplja, from the village Irgunnuk, lying five English miles east of the *Vega's* winter quarters at Pitlekaj, said that the sea off these villages is open all summer, except when northerly winds prevail. On the other hand, he said that farther westward, as at Irkaipij, ice could nearly always be seen from the land.

"12. Kapatljin, from Kingetschkun, a village between Irgunnuk and Behring's Straits, stated on the 11th January that there was then open water at that village. He said further, that Behring's Straits in winter are filled with ice when the wind is southerly, but open when the wind is northerly. The same day a Chukch from Nettej-Kengitschkau, also between Irgunnuk and Behring's Straits, stated that ice then lay off that village. He confirmed Kapatljin's statement regarding Behring's Straits.

"13. Kvano, from Uedlje, near Behring's Straits, said that there the sea is always open from May to the end of September."

On the 13th March we came to know that spirits, too, form an article of commerce here. For, without having obtained any liquor from the *Vega*, the Chukches at Yinretlen had the means of indulging in a general fuddle, and that even their friendly disposition gives way under the effects of the intoxication we had a manifest proof, when the day after they came on board with blue and yellow eyes, not a little seedy and ashamed. In autumn a tall and stout Chukch giantess, who then paid us a visit, informed us that her husband had been murdered in a drunken quarrel.

Sledges of considerable size, drawn by reindeer, began after the middle of March to pass the *Vega* in pretty large numbers. They were laden with reindeer skins and goods bought at the Russian market-places, and intended for barter at Behring's Straits.

The reindeer Chukches are better clothed, and appear to be in better circumstances and more independent than the coast

Chukches, or, as they ought to be called in correspondence with the former name, the dog Chukches. As every one owns a reindeer herd, all must follow the nomad mode of living, but at the same time they carry on traffic between the savages in the northernmost parts of America and the Russian fur-dealers in Siberia, and many pass their whole lives in commercial journeys. The principal market is held annually during the month of March, on an island in the river Little Anjui, 250 versts from Nischni Kolymsk. The barter goes on in accordance with a normal price-list, mutually agreed upon by the Russian merchants and the oldest of the Chukches. The market is inaugurated on the part of the Russians by a mass performed by the priest,[1] who always accompanies the Russian crown commissioner, and in the Chukches' camp with buffoonery by one of the Chukch Shamans. At such a market there is said to be considerable confusion, to judge by the spirited description which Wrangel gives of it (*Reise*, i. p. 269). We ought, however, to remember that this description refers to the customs that prevailed sixty years ago. Now, perhaps, there is a great change

[1] During the market the Russian priest endeavours to make proselytes; he succeeds, too, by distributing tobacco to induce one or two to subject themselves to the ceremony of baptism. No true conversion, however, can scarcely come in question on account of the difference of language. As an example of how this goes on, the following story of Wrangel's may be quoted. At the market a young Chukch had been prevailed upon, by a gift of some pounds of tobacco, to allow himself to be baptised. The ceremony began in presence of a number of spectators. The new convert stood quiet and pretty decent in his place till he should step down into the baptismal font, a large wooden tub filled with ice-cold water. In this, according to the baptismal ritual, he ought to dip three times. But to this he would consent on no condition. He shook his head constantly, and brought forward a large number of reasons against it, which none understood. After long exhortations by the interpreter, in which promises of tobacco probably again played the principal part, he finally gave way and sprang courageously down into the ice-cold water, but immediately jumped up again trembling with cold, crying, "My tobacco! my tobacco!" All attempts to induce him to renew the bath were fruitless, the ceremony was incomplete, and the Chukch only half baptised.

there. In the commercial relations in north-eastern Asia in the beginning of this century, we have probably a faithful picture of the commerce of the Beormas in former days in north-eastern Europe. Even the goods were probably of the same sort at both places, perhaps, also, the stand-points of the culture of the two races.

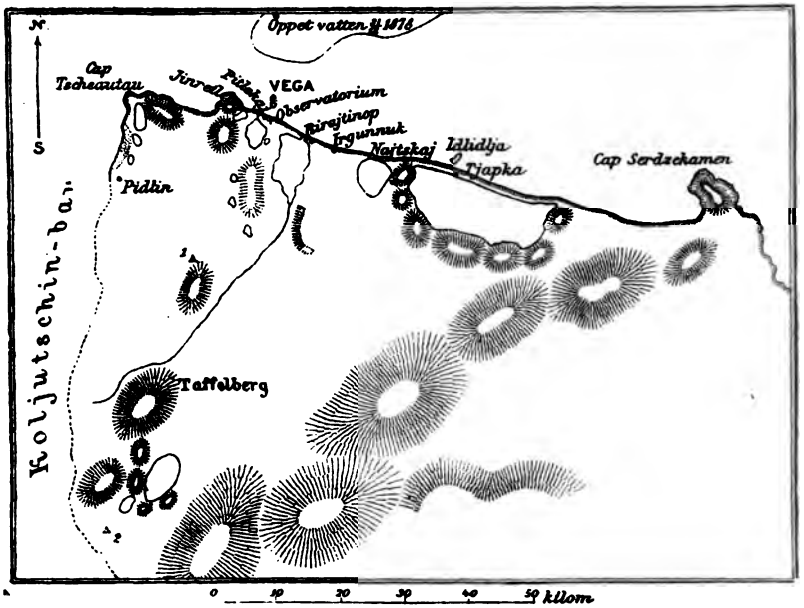
Besides the traders, a large number of Chukches from Kolyutschin Island and other villages to the west, travelled past us with empty sledges, to which were harnessed only a few dogs. They returned in the course of a few days with their sledges fully laden with fish which they said they had caught in a lagoon situated to the eastward. They also sometimes sold a delicious variety of the Coregonus taken in a lake in the interior some distance from the coast.

Further on in winter a number of excursions were undertaken in different directions, partly to find out these fishing places, partly to get an idea of the mode of life of the reindeer Chukches. I, however, never ventured to give permission for any long absence from the vessel, because I was quite convinced that the sea round the *Vega* after a few days' constant southerly storm might become open under circumstances which would not permit us to remain in the open road where we lay moored; my comrades' desire to penetrate far into the Chukch peninsula could not on that account be satisfied. But short as these excursions were, they give us, however, much information regarding our winter life, and our contact with the little-known tribe, on the coast of whose homeland the *Vega* had been beset, and on that account, perhaps, there may be reasons for making extracts from some of the reports given in to me with reference to these journeys.

Palander's and Kjellman's excursion to a reindeer Chukch camp south-west of Pitlekaj, is sketched by the former thus:—

"On the 17th March, 1879, accompanied by Dr. Kjellman, I went out with a sledge and five men, among them a native as

guide, to the reindeer Chukch camp in the neighbourhood of Taffelberg (Table Mountain), with a view to obtain fresh reindeer flesh. The expedition was fitted out with two days' provisions, tent, mattrasses, and *pesks*. The reindeer Chukches were met with eleven English miles from the vessel. On an eminence here were found two tents, of which one at the time was uninhabited. The other was occupied by the Chukch, Rotschitlen, his young wife, and another young pair, the latter, if I under-



MAP OF THE REGION ROUND THE "VEGA'S" WINTER QUARTERS.

Mainly after G. Bove.

1. Rotschitlen's tent. 2. Yettugin's tent.

stood them right, being on a visit, and properly having their home at Irgunnuk.

"Round the tent, which was considerably smaller than those we daily saw at the coast, lay a number of sledges piled up on one another. These sledges differed from the common dog-sledges in being considerably larger and wider in the gauge. The runners were clumsy and axed from large wood.

"Our proposal to purchase reindeer was immediately declined, although we offered in exchange bread, tobacco, rum, and even guns. As a reason for this refusal they stated that the reindeer at this season of the year are too lean to be slaughtered. We saw about fifty reindeer pasturing on an eminence at a distance of several thousand feet from us.

"In the afternoon Kjellman and I were invited into the tent, where we passed an hour in their sleeping chamber. On our entrance the lamp, which was filled with seal oil, was lighted; a sort of moss (sphagnum) was used as a wick. Our hostess endeavoured to make our stay in the tent as agreeable as possible; she rolled together reindeer skins for pillows and made ready for us a place where, stretched at full length, we might enjoy much needed repose. In the outer tent the other women prepared supper, which consisted of boiled seal's-flesh. We received a friendly invitation to share their meal, but as we had no taste for seal's-flesh, we declined their offer under the pretext that we had just had dinner. They took their meal lying with the body in the inner tent, but with the head under the reindeer-skin curtain in the outer, where the food was. After the meal was partaken of, their heads were drawn within the curtain; our host divested himself of all his clothes, the trousers excepted, which were allowed to remain. Our hostess let her *pesk* fall down from her shoulders, so that the whole upper part of the body thus became bare. The reindeer-skin boots were taken off, and turned outside in; they were carefully dried and hung up in the roof over the lamp to dry during the night. We treated the women to some sugar, which, in consequence of their want of acquaintance with it, they at first examined with a certain caution, finding afterwards that it tasted exceeding well. After the meal our host appeared to become sleepy; we accordingly said good-night, and went to our own tent, where it was quite otherwise than warm, the temperature during the night being about—11° C.

"After for the most part a sleepless night, we rose at half-past six next morning. When we came out of the tent we saw all the reindeer advancing in a compact troop. At the head was an old reindeer with large horns, that went forward to his master, who had in the meantime gone to meet the herd, and bade him good-morning by gently rubbing his nose against his master's hands. While this was going on the other reindeer stood drawn up in well-ordered ranks, like the crew in divisions on board a man-of-war. The owner then went forward and saluted every reindeer; they were allowed to stroke his hands with their

noses. He on his part took every reindeer by the horn and examined it in the most careful way. After the inspection was ended at a sign given by the master the whole herd wheeled round and returned in closed ranks, with the old reindeer in front, to the previous day's pasture.

"The whole scene made a very favourable impression on us; it was not the grim hard savage showing in a coarse and barbarous way his superiority over the animals, but the good master treating his inferiors kindly, and having a friendly word for each of them. Here good relations prevailed between man and the animals. Rotschitlen himself was a stately young man, with an intelligent appearance and a supple handsome figure. His dress, of exceedingly good cut and of uncommonly fine reindeer skin, sat close to his well-grown frame, and gave us an opportunity of seeing his graceful and noble bearing, which was most observable when he was in motion.

"On our repeating our proposal to purchase reindeer we again met with a refusal, on which we struck our tent and commenced our return journey. We came on board on the 18th March at 3 o'clock P.M., after a march of four hours and three-quarters.

"The way to the reindeer camp rose and fell gently. The snow was hard and even, so that we could go forward rapidly. On the way out four foxes and some ravens were seen. At one place we found a large number of lemming passages excavated through the snow in an oblique direction towards the ground. Most of them were scratched up by foxes. The descent to an untouched lemming nest was cylindrical, and four and a half centimetres in diameter. During both days we had snow, and a thick and foggy atmosphere, so that we could see only a short distance before us; we did not however go astray, thanks to the good eyes and strongly developed sense of locality of our guide, the native."

Brusewitz's and Nordquist's Excursion to Nutschoitjin.

Of this Nordquist gives the following account:—

"On the 20th March, at 9 o'clock A.M. Lieut. Brusewitz, boatswain Lustig, the Norwegian hunters Johnsen and Sievertsen, the Chukch Notti, and I, left the *Vega*. Our equipment, which consisted of provisions for eight days, cooking apparatus, canvas tent, india-rubber mattrasses, reindeer-skin *pesks*, &c., we drew after us on a sledge. At 2.45 P.M. we came to Nutschoitjin (Coregonus Lake). During our journey we passed a river

which flows between Nutschoitjin and the mountain Hotschkeanranga about ten English miles south of this lake and falls into the great lagoon south of Pitlekaj. Farther into the interior this river, according to Notti's statement, flows through several lakes: he also informed us that in summer it abounds very much in salmon (*lienne*). Some sandy hills formed the watershed between it and Nutschoitjin. The only animal we saw during our outward journey was a fox. On the other hand we found traces of hares, ptarmigan, and a couple of lemmings. After we had found a suitable camping-place, we began to build a snow-house, which, however, we could not get ready till next day.

"On the 21st Brusewitz and I went out to view our nearest surroundings. On a hill north of the lake, where Potentilla, Carex, and Poa stuck up through the snow-covering, we saw a large number of traces of the fox, the hare, and the ptarmigan. We employed the 22nd in cutting some holes in the ice, which was about one and a half metres thick, and in setting a net. For I wished to ascertain what species of Coregonus it is which, according to Notti's statement, occurs in abundance in this lake. At the place where the net was set there was something more than a metre of water under the ice. The bottom consisted of mud. When we cut a hole in the middle of the lake in order to get deeper water we found that the ice, one and a half metres thick there, reached to the bottom.

"Next morning we got in the net eleven Coregoni, of which the largest were about thirty-five centimetres long. Although the weather was grey and we could not see very far, we went the same day to the hill Hotschkeanranga; partly to determine its height, and partly from its summit, which is visible for a great distance, to get a view of the appearance of the surrounding country. After crossing the river which flows between Nutschoitjin and Hotchkeanranga, we began to ascend the long slope on whose summit Hotchkanrakenljeut (Hotchkeanranga's head) rises with steep sides above the surrounding country. Over the slope were scattered loose blocks of stone of an eruptive rock. The crest of "the head" was also closely covered with loose stones. On the north or wind side these stones were covered with a hard beaten crust of snow nearly two feet thick; on the south side most of them were bare. According to Brusewitz the southern slopes are still steeper than the northern. South of the hill he saw a large valley—probably a lake—through which flows the river which we crossed.

"As on the outward journey I went with Notti, he advised me

to offer a little food and brandy to the Spirit of the Lake, *itjaken kamak*, in order to get good net fishing. On my inquiring what appearance he had, Notti replied "*uinga lilapen*," "I have never seen him." Besides this spirit there are in his view others also in streams, in the earth, and in some mountains. The Chukches also sacrifice to the sun and moon. On the other hand they do not appear, as some other races, to pay any sort of worship to their departed friends. When I gave him a biscuit and bade him offer it, he made with the heel a little depression in the snow on Nutschoitjin, crumbled a little bit of the biscuit in pieces, and threw the crumbs into the hollow. The rest of the biscuit he gave back, declaring that *kamak* did not require more, and that we should now have more fish in the net than the first time. Notti said also that the Chukches are wont to sacrifice something for every catch. Thus have probably arisen all the collections of bear and seal skulls and reindeer horns, which we often saw on the Chukch coast, especially on eminences.

"After we had read off the aneroid, we speedily made our way to the snow-house, because during the interval a violent storm of drifting snow had arisen, so that we could not see more than half a score of paces before us. On the slope below "the head" we had already on our way thither seen traces of two wild reindeer. Notti said that there are a few of them on the hill the whole winter. The greater number, however, draw farther southward, and approach the coast only during summer. Johnsen had wounded an owl (*Strix nyctea*), which however made its escape. On the 24th snow fell and drifted during the whole day, so that we could not go out to shoot. On the 25th we came on board again.

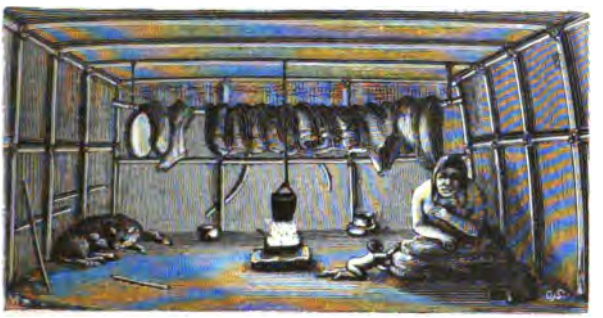
"According to the aneroid observations made during the journey, the highest summit we visited had a height of 197 metres."

Lieutenant Bove's Account of an Excursion to Najtskaj and Tjapka.

"On the 19th April, at 4 o'clock A.M. the hunter Johnsen and I started on a short excursion eastward along the coast, with a view to pay a visit to the much frequented fishing station Najtskaj, where our old friends from Pitlekaj had settled. We had a little sledge which we ourselves drew, and which was laden with provisions for three days and some meteorological and hydrographical instruments.

"At 6 o'clock A.M. we reached Rirajtinop, where we found Notti, a serviceable, talented, and agreeable youth. The village Rirajtinop, which formerly consisted of a great many tents, now had only one tent, Notti's, and it was poor enough. It gave the inhabitants only a slight protection against wind and cold. Among household articles in the tent I noticed a face-mask of wood, less shapeless than those which according to Whymper's drawings are found among the natives along the river Youcon, in the territory of Alaska, and according to Dr. Simpson among the West-Eskimo. I learned afterwards that this mask came from Päk, Behring's Straits, whither it was probably carried from the opposite American shore.

"The village Irgunnuk lies from three to four hundred metres from Rirajtinop, and consists of five tents, one of which two days

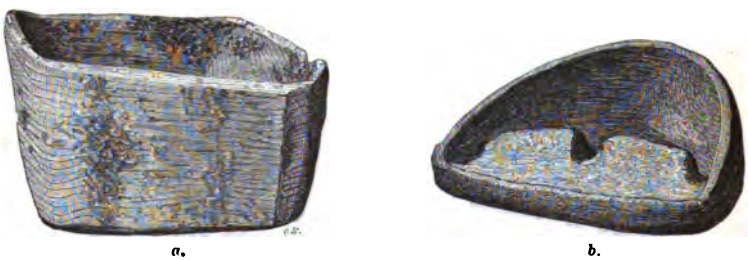


THE SLEEPING CHAMBER IN A CHUKCH TENT.
(After a drawing by the seaman Hansson.)

before had been removed from Yinretlen. The tents are as usual placed on earthy eminences, and have if possible the entrance a couple of paces from some steep escarpment, manifestly in order that the door-opening may not be too much obstructed with snow. I reckon the population of Irgunnuk at forty persons.

"Off this village the ice is broken up even close to the land into *torosses*, five to six metres high, which form a chain which closely follows the shore for a distance of five to six hundred metres to the eastward. The coast from Irgunnuk to Najtskaj runs in a straight line, is low, and only now and then interrupted by small earthy eminences, which all bear traces of old dwellings. Each of these heights has its special name: first Uelkantinop, then Tiumgatti, and lastly Tiungo, two miles west of Najtskaj.

In the neighbourhood of Uelkantinop we were overtaken by a reindeer-Chukch, who accompanied us to Najtskaj in order there to purchase fish and seal-blubber. At noon we reached Najtskaj, where our arrival had been announced by a native, who, with his dog-team, had driven past us on the way. Accordingly on our entrance we were surrounded by the youth of the village, who deafened us with their unceasing cries for bread (*kauka*), tobacco, *ram*, &c. After some moments the begging urchins were joined both by women and full-grown men. We entered a tent, which belonged to a friend or perhaps relation of Notti. There we were very well received. In the same tent the reindeer-Chukch also lodged who had given us his company on the way. He went into the sleeping chamber, threw himself down there, took part in the family's evening meal, all almost without uttering a word to the hostess, and the next morning he started without having saluted the host. Hospitality is here



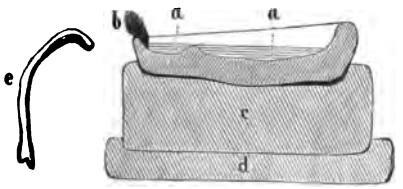
a. *b*.

CHUKCH LAMPS.
a. Of wood. *b*. Of stone.
One-fifth of the natural size.

of a peculiar kind. It may perhaps be expressed thus: *To-day I eat and sleep in your tent, to-morrow you eat and sleep in mine*; and accordingly, as far as I saw, all, both rich and poor, both those who travelled with large sledges, and those who walked on foot, were received in the same way. All are sure to find a corner in the tent-chamber.

"The tent-chamber, or *yaranga*, as this part of the tent is called by the natives, takes up fully a third-part of the whole tent, and is at the same time work-room, dining-room, and sleeping chamber. Its form is that of a parallelopiped; and a moderately large sleeping chamber has a height of 1·80 metre, a length of 3·50, and a breadth of 2·20 metres. The walls are formed of reindeer skin with the hair inwards, which are supported by a framework of posts and cross-bars. The floor

consists of a layer of grass undermost, on which a walrus skin is spread. The grass and the skin do not form a very soft bed, yet one on which even a tired European wanderer may find rest. The interior of the sleeping-chamber is lighted and warmed by lamps, whose number varies according to the size of the room. A moderately large chamber has three lamps, the largest right opposite the entrance, the two others on the cross walls. The lamps are often made of a sort of stone, which is called by the natives *ukulschi*. They have the form of a large ladle. The fuel consists of train-oil, and moss is used for the wick. These lamps besides require constant attention, because half-an-hour's neglect is sufficient to make them smoke or go out. The flame is at one corner of the lamp, whose moss wick is trimmed with a piece of wood of the shape shown in the drawing. The lamp rests on a foot, and it in its turn in a basin. In this way every drop of oil that may be possibly spilled is



SECTION OF A CHUKCH LAMP.
(After a drawing by G. Bove.)
a a. The oil. *b*. The wick. *c*. The foot. *d*. The basin under it.
e. Stick for trimming the wick.

collected. If there is anything that this people ought to save, it is certainly oil, for this signifies to them both light and heat. In the roof of the bedchamber some bars are fixed over the lamps on which clothes and shoes are hung to dry. The lamps are kept alight the whole day; during night they are commonly extinguished, as otherwise they would require continual attention. Some clothes and fishing implements, two or three reindeer skins to rest upon—these are the whole furniture of a Chukch tent.

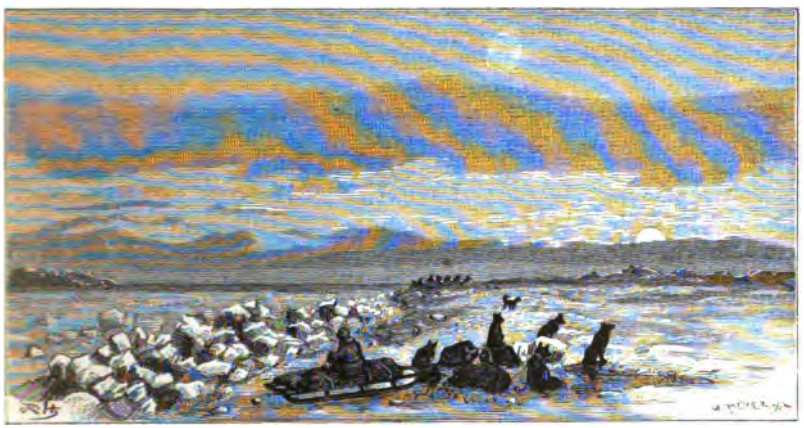
"Every tent is besides provided with some drums (*yárar*). These are made of a wooden ring, about seventy centimetres in diameter, on which is stretched a skin of seal or walrus gut. The drum is beaten with a light stick of whalebone. The sound thus produced is melancholy, and is so in a yet higher degree when it is accompanied by the natives' monotonous,

commonly rhythmical songs, which appear to me to have a strong resemblance to those we hear in Japan and China. A still greater resemblance I thought I observed in the dances of these peoples. Notti is a splendid *yárar*-player. After some pressing he played several of their songs with a feeling for which I had not given him credit. The auditors were numerous, and by their smiles and merry eyes one could see that they were transported by the sounds which Notti knew how to call from the drum. Notti was also listened to in deep silence, with an admiration like that with which in a large room we listen to a distinguished pianist. I saw in the tent no other musical instrument than that just mentioned.

CHUKCH SHAMAN DRUM.
One-eighth the natural size.

"The day we arrived at Najtskaj we employed in viewing the neighbourhood of the village. We accordingly ascended a hill about thirty metres high to the south of the village in order to get a clear idea of the region. From the summit of the hill we had a view of the two lagoons west and east of Najtskaj. The western appeared, with the exception of some earthy heights, to embrace the whole stretch of coast between Najtskaj, the hill at Yinretlen, and the mountains which are visible in the south from the Observatory. The lagoon east of Najtskaj is separated from the sea by a high rampart of sand, and extends about thirty kilometres into the interior, to the foot of the chain of hills which runs along there. To the eastward the lagoon extends along the coast to the neighbourhood of Serdze Kamen. This cape was clearly seen and, according to an estimate which I do not think was far from the truth, was situated at a distance of from twenty-five to twenty-six kilometres from Najtskaj. It sinks terracewise towards the sea, and its sides are covered with stone pillars, like those we saw in the neighbourhood of Cape Great Baranoff. Serdze Kamen to the south is connected with mountain heights which are the higher the farther they are from the sea. Some of these have a conical form, others are table-shaped, reminding us of the Ambas of Abyssinia. Ten or twelve miles into the interior they appear to reach a height of six hundred to nine hundred metres.

"The fishing in the eastern lagoon takes place mainly in the neighbourhood of Najtskaj, at a distance of about five kilometres from the village. Hooks are exclusively used, and no nets or other fishing implements. In a few minutes I saw twenty cod (*urokadlin*) caught, and about as many small fish, called by the natives *nukionukio*. For the fishing the natives make a hole in the ice, a decimetre in diameter. Round the hole they build, as a protection against wind and drifting snow, a snow wall eighty centimetres high, forming a circle with an inner diameter of a metre and a half. The fish-hooks are of iron and are not barbed. The line is about five metres long,



THE COAST BETWEEN PADLJONNA AND ENJURMI.]
To the west Idlidlja Island, in the background the village Tjapka, to the right the great lagoon.
(After a drawing by O. Nordquist.)

and is fixed to a rod nearly a metre in length. At the end of the angling line hangs a weight of bone, and beside it the hook. It is generally the women who fish, yet there are generally two or three men about to open the holes, build the walls, and keep the fishing-places clear. All the holes with their shelter-walls lie in an arc, about a kilometre in length, whose convex side is turned to the east. The ice in the lagoon was 1·7 metre thick, the water 3·2 metres deep, and the thickness of snow on the ice 0·3 metre.

"The day after our arrival at Najtskaj we visited the village Tjapka, which lies at a distance of six kilometres. This village

contains thirteen tents, some of which are more roomy and better built than any Chukch tent I have previously seen. We lodged in a tent which belonged to Erere, a friendly man with a face that was always cheerful. His sleeping-chamber was so large that it could hold more than one family. We found the inmates there completely naked, Erere's wife, Kedlanga, not excepted. Kedlanga was well formed, her bosom full, her stomach somewhat projecting, the thighs poor, the legs slender, the feet small. The men appeared to have a greater disposition to stoutness than the women. Some of the children had disproportionately large stomachs. Both men and women wore copper rings on the legs, the wrists, and the upper arms. On festivals they decorate themselves with iron rings, with which some reminiscence appears to be connected, to judge by the fact that they will not part with them.

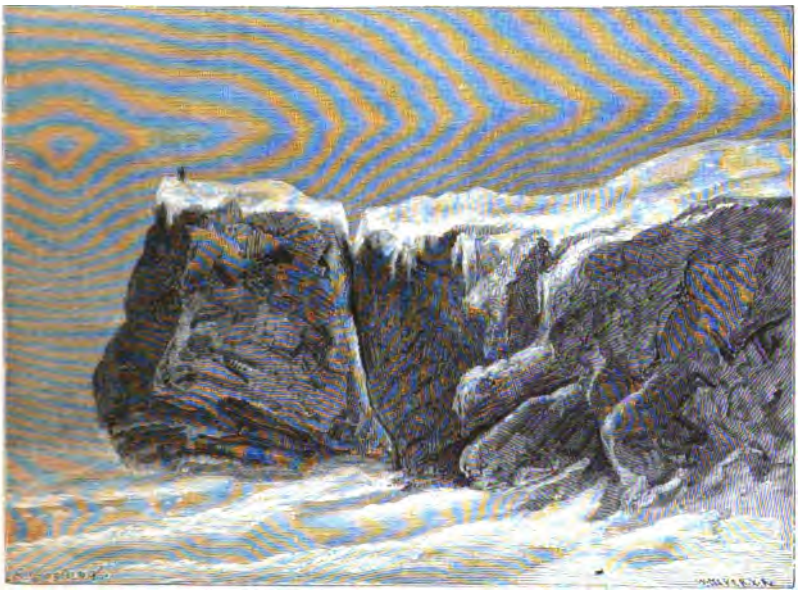
"Erere's family was very numerous, according to the prevailing state of matters here. He had five children, whose names, according to their age, were, Hatanga, Etughi, Vedlat, Uai, and Umonga. In all the tents which I visited I have inquired the number of children. Only two or three wives had more than three; the average may be estimated at two.

BRACELET OF COPPER.
Half the natural size.

"The children are from their tenderest years set apart for each other; thus Etughi, Erere's second son, who was little more than eight, was set apart for Keipteka, a girl of six or seven. Etughi and Keipteka slept under the same roof, though apart. "When they grow bigger," said Erere to me, "their sleeping-places will be put alongside each other." At what age this takes place I have not ascertained, but I suppose that it is very early, as is common with all Oriental races.

"Right opposite Tjapka lies a small island, by the natives called Idlidlja, which is about 800 metres in circumference. Its shores rise perpendicularly on all sides except that which is opposite Tjapka, in which direction it sinks with a steep slope. On the north end of it we found three or four whales' bones and some pieces of driftwood, but nothing to indicate that there had been any Onkilon dwellings there. The island swarmed with hares, which the inhabitants of Tjapka hunt with the bow. For this hunting they are accustomed to build circular walls of snow, pierced with loopholes, through which they shoot the unsuspecting animals.

"Regarding life in the tent I have still the following notes: The most troublesome work is given to the older women. They rise early to light and attend to the lamps, yoke the dogs, and go fishing. The young women, on the other hand, sleep far into the day. The housewives return at noon; their work is then finished, if we do not consider as work the constant motion of the tongue in talk and gossip. The younger people have it assigned to them to sew clothes, arrange the fishing-lines and nets, prepare skins, &c. Sewing-thread is made from the back



THE NORTH END OF IDLIDLJA ISLAND.
(After a drawing by O. Nordquist.)

sinews of the reindeer, which they procure by barter from the reindeer-Chukches, giving for them fish and seal-blubber.

"One cannot, without having seen it, form any idea of the large quantity of food they can consume. One evening I saw eight persons, including one child, eat about 30 lbs. of food. The bill of fare was: 1, raw fish; 2, soup; 3, boiled fish; 4, seal-blubber; 5, seal-flesh. The raw fish commonly consists of frozen cod. The soup is made partly of vegetables, partly of

seal-blood; I saw both kinds. Vegetable soup was prepared by boiling equal quantities of water and vegetables, till the mixture formed a thick pap. The blood soup is cooked by boiling the blood together with water, fish, and fat. They are very fond of this soup. The seal-blubber they eat by stuffing into the mouth the piece which has been served to them, and then cutting a suitable mouthful with the knife, which they bring close to the lips. In the same way they do with the flesh.

"With the exception of the old women's gossip the greatest quietness prevails in the sleeping-chamber. It is not uncommon for men to visit each other. Thus the first night we spent at Najtskaj the tent where we lodged was full of people, but without the least disturbance arising. If one had anything to say he talked in quite a low tone, as if he were shy. He was listened to attentively, without any interruption. First when he had finished another began.

"Affection between spouses and parents and children is particularly strong. I have seen fathers kiss and caress their children before they went to rest, and what I found most remarkable was that the children never abused this tender treatment. Whatever one gave them, it was their first thought to divide it with their parents. In this respect and in many others they were far in advance of a large number of European children."

Lieutenant Bove's Report on an Excursion along with Dr. Almquist to the Interior of the Chukch Peninsula, from the 13*th to the* 17*th June*, 1879.

"We started from the vessel on the morning of the 13th June with a view to penetrate as far as possible into the interior of the Chukch peninsula. For the journey we had hired, for a liberal payment, two sledges drawn by dogs from Rotschitlen, a Chukch at Irgunnuk. The dogs and sledges surpassed our expectation. In fourteen hours we traversed a distance of nearly forty minutes, including bends, which corresponds to a speed of three, perhaps four, English miles an hour, if we deduct the rests which were caused by the objects of the journey—scientific researches. This speed strikes me as not inconsiderable, if we consider the weight which the dogs must draw, and the badness and unevenness of the way. For the ground was undulating, like a sea agitated by a storm. But pleased as we were with our sledges and dogs, we were as dissatisfied with

Rotschitlen, a faint-hearted youth, without activity or experience. With another driver we might have been able in a few days to penetrate as far as the bottom of Kolyutschin Bay, which differs greatly in its form from that which Russian, English, and German maps give to it. It is not improbable that it is almost connected by lakes, lagoons, and rivers with St. Lawrence Bay or Metschigme Bay, whose inner parts are not yet investigated.

"After we left the lagoons at Pitlekaj and Yinretlen, the coast began gradually to rise by escarpments, each about five metres in height. The plains between the escarpments are full of lagoons or marshes. Such a terrain continued until, about five hours' way from the vessel, we came to a height of twenty-seven metres. From this point the terrace-formations cease, and the terrain then consists of a large number of ranges of heights, intersected by rivulets, which during the snow-melting season must be very much flooded. Seven or eight hours' way from the vessel we met with such a rivulet, which farther to the S.S.E. unites with another which runs between two rocky escarpments twenty metres high. On one of these we pitched our tent, in order to draw and examine some hills which were already divested of the winter dress they had worn for nine long months. On the top of one of the hills we found marks of two recently-struck tents, which probably belonged to a reindeer Chukch, who had now settled halfway between Pitlekaj and Table Mount upon a chain of heights which appears to separate the Irgunnuk lagoon from the rocky eastern shore of Kolyutschin Bay. At our resting place we found a large number of reindeer horns and a heap of broken bones.

"After resuming our journey we came in a short time to the foot of Table Mount, whose height I reckoned at 180 metres. It slopes gently to the west and south (about 10°), but more steeply to the east and north (about 15°). The animal world there showed great activity. In less than an hour we saw more than a dozen foxes that ran up and down the hills and circled round us, as if they ran with a line. Fortunately for them they kept at a respectful distance from our doctor's sure gun.

"On the other side of Table Mount the ground sinks regularly towards Kolyutschin Bay. Here for a while we sought in vain for Yettugin's tent, in which we intended to pass the night, and which had been fixed upon as the starting-point of future excursions, till at last reindeer traces and afterwards the sight of some of these friendly animals brought us to the right way, so that about 9 o'clock P.M. we got sight of the longed-for dwelling in the middle of a snow-desert. At the word *yaranga* (tent)

the dogs pointed their ears, uttered a bark of joy, and ran at full speed towards the goal. We arrived at 10.30 P.M. In the tent we were hospitably received by its mistress, who immediately made the necessary preparations for our obtaining food and rest. Yettugin himself was not at home, but he soon returned with a sledge drawn by reindeer. These animals had scarcely been unharnessed when they ran back to the herd, which according to Yettugin's statement was six kilometres east of the tent.

"I have never seen a family so afflicted with ailments as Yettugin's. The sexagenarian father united in himself almost all the bodily ailments which could fall to the lot of a mortal. He was blind, leprous (?), and had no use of the left hand, the right side of the face, and probably of the legs. His body was nearly everywhere covered with the scars of old sores from four to five centimetres in diameter. As Dr. Almquist and I were compelled to pass the night in the same confined sleeping-chamber with him, it was therefore not to be wondered at that we drew ourselves as much as possible into our corner. The sleeping-chamber or inner tent of a reindeer-Chukch is besides much more habitable than that of a coast-Chukch; the air, if not exactly pure, may at least be breathed, and the thick layer of reindeer skins which covers the tent floor may well compare in softness with our beds on board. Yettugin, his wife Tengaech, and his brother Keuto, slept out of doors in order to give us more room and not to disturb us when rising. Keuto had inherited no small portion of his father's calamity. He was deaf, half idiotic, and on his body there were already traces of such spots as on the old man's. Keuto was however an obliging youth, who during our stay in the tent did all that he could to be of use to us, and constantly wandered about to get birds and plants for us. He was a skilful archer; I saw him at a distance of twenty or twenty-five paces kill a small bird with a blunt arrow, and when I placed myself as a target he hit me right in the middle of the breast at a distance of perhaps thirty metres.

"The 14th was employed by me in astronomical and geodetical observations, and by Dr. Almquist in excursions in the neighbourhood of Yettugin's tent in order to investigate the fauna and flora of the neighbourhood. About 10 o'clock P.M. he returned, quite exhausted after eight hours' walking in deep water-drenched snow under a perceptible solar heat. The results of the excursion were in all respects exceedingly good, not only in consequence of a number of *finds* in natural history, but also through the discovery that the shore of Kolyutschin

Bay runs three-quarters of a mile south-west of Yettugin's tent, which was situated in 66° 42′ 4″ North Lat., and 186° 24′ 0″ Long., east from Greenwich. Dr. Almquist had walked four or five miles along the eastern shore of the bay, which at most places is perpendicular with a height of fifteen metres. In consequence of this discovery we determined to continue our hydrographical observations as far as the bottom of the bay, which, according to Yettugin's account, was two days' march from the tent. But we could not carry out our plan in consequence of our guide's laziness, for he declared that on no conditions would he accompany us farther. Neither entreaties nor threats availed to disturb this his resolution. I endeavoured myself to drive the sledges, but the dogs would not move out of the spot, though, following Rotschitlen's system, I thrashed them very soundly.

"The place where Yettugin's tent was pitched offered us a view of an extensive snow-plain, which was enclosed on all sides by high hills. In the north and north-east Table Mount and the Tenen hill keep off the north winds, and to the south the encampment is protected by a long and high mountain chain from the winds coming from that quarter. I calculated the height of some of the mountains at from 1200 to 1500 metres, and their azure-blue colour furrowed by dark lines appears to me to indicate the presence of ice on the slopes. One of the summits of this mountain chain was easily recognisable. It was a truncated cone, perhaps 1500 metres high. Kolyutschin Bay lies between these mountains and Yettugin's tent. Its western shore also appears to rise perpendicularly from the sea, and it is higher than the eastern. The bay, which appears to be much larger than it is represented on the maps, was covered with level ice; only here and there a piece of ice covered with snow was seen sticking up.

"As we were forced to desist from visiting the interior of Kolyutschin Bay, we determined to go to the ground where Yettugin's reindeer pastured. We therefore left the tent on the evening of the 15th and travelled E.N.E. The warmth, which had now commenced, began to make travelling over snow fields difficult; the dogs sank to the stomach, and not unfrequently we had to alight in order to help the poor animals to climb the hills we were obliged to ascend. Scarcely however had they come to the reindeer tracks before even the most exhausted of them rushed along at the top of their speed, which might be pleasant enough uphill, but when they were coming down it was very dangerous, because the slope nearly always ends with a steep

escarpment. We came once, without observing it, to the edge of such a precipice, and if we had not succeeded in time in slackening our speed a nice confused mass of men, dogs, and sledges would have tumbled over it. In order to excite their draught animals the Chukches avail themselves of their dogs' inclination to run after the reindeer, and during their journeys they endeavour to spur them on yet more by now and then imitating the reindeer's cry. After two or three hours travelling we fell in with the first reindeer, and then by degrees with more and more, until finally about 11 o'clock P.M. we came to a numerous herd, tended by Yettugin. I applied to him, asking him to barter a reindeer in good condition for a gun which I had brought along with me. After various evasions Yettugin at length promised to give us next day the reindeer for the gun. He would not however himself, or with his own knife, kill the reindeer; on which account I requested Dr. Almquist to give it the *coup de grâce*.

"In consequence of the soft state of the snow we were obliged to defer the commencement of our return journey to the evening of the 16th. We now travelled over the chain of hills which unites Table Mount with Tenen, and descended their northern steep slope towards an extensive plain, studded for the most part with bogs and marshes. The 17th came in with mist and considerable warmth. The mist limited the circle of vision to a distance of some few metres, and the high temperature in a short time destroyed the crust which had been formed in the course of the preceding night on the surface of the snow, and melted the layers of snow which still covered the northern slopes of these two hills. The southern slopes on the other hand were almost quite bare, and the valleys began to be filled with water. Four or five days as warm as these and I believe there scarcely would be any snow remaining round Kolyutschin Bay. The illusions caused by the white fog illuminated by the sunlight were very astonishing. Every small spot of ground appeared as an extensive snow-free field, every tuft of grass as a bush, and a fox in our immediate neighbourhood was for a moment taken for a gigantic bear. Besides, during such a fog the action of the sunlight on the eyes was exceedingly painful even in the case of those who carried preservers. During the return Rotschitlen lost his way in consequence of the numerous different tracks. Fortunately I had observed how we travelled, and could with the help of the compass pilot our two small craft to a good haven. On the 17th of June at 1.30 P.M. we were again in good condition on board the *Vega*."

In the society on board the prospects of an alteration in the constant north winds, the perpetual snow-storms and the unceasing cold, and the hope of a speedy release from the fetters of the ice, were naturally constantly recurring topics of conversation. During this time many lively word-battles were fought between the weather prophets in the gunroom, and many bets made in jest between the optimists and pessimists. The former won a great victory, when at noon on the 8th February the temperature rose to + 0°·1 C., but with the exception of this success fortune always went against them. The north wind, the drifting snow and the cold, would never cease. A blue water-sky indeed was often visible at the horizon to the north and north-east, but the "clearing" first reached our vessel a couple of hours before we left our winter haven for ever, and up to the 15th June the thickness of the ice was almost undiminished (1½ metre). The sun rose higher and higher, but without forming any crust upon the snow, although upon the black hull of the *Vega*, perhaps with the help of the heat in the interior, it had by the 14th March melted so much snow that small icicles were formed at the gunwale. It was one of the many deceptive prognostications of spring which were hailed with delight. However, immediately after severe cold recommenced and continued during the whole of the month of April, during which the temperature of the air never rose above — 4°·6, the mean temperature being — 18°·9.

May began with a temperature of — 20°·1. On the 3rd the thermometer showed — 26°·8, and in the "flower-month" we had only for a few hours mild weather with an air temperature + 1°·8. Even the beginning of June was very cold; on the 3rd we had — 14°·3, with a mean temperature for the twenty-four hours of — 9°·4. Still on the 13th the thermometer at midnight showed — 8°·0, but the same day at noon with a gentle southerly wind a sudden change took place, and after that date it was only exceptionally that the thermometer in the open air sank

below the freezing-point. The melting and evaporation of snow now began, and went on so rapidly that the land in the end of the month was almost free of snow.

Under what circumstances this took place is shown by the following abstract of the observations of temperature at Pitlekaj from the 13th June to the 18th July, 1879 :—

	Max.	Min.	Mean.		Max.	Min.	Mean.
June 13	+ 3·6°	− 8·0°	− 1·95°	July 1	+ 0·8°	− 0·6°	+ 0·07°
14	+ 2·6	+ 0·2	+ 1·47	2	+ 1·1	− 1·0	+ 0·40
15	+ 3·1	+ 1·7	+ 2·28	3	+ 5·0	+ 1·0	+ 2·28
16	+ 1·6	− 0·6	+ 0·90	4	+ 3 8	+ 1·4	+ 2·68
17	+ 3·0	+ 0·2	+ 1·22	5	+ 5·2	+ 2·0	+ 3·60
18	+ 2·4	− 0 6	+ 1·23	6	+ 3·3	+ 1·0	+ 2·28
19	+ 3·6	+ 1·4	+ 2·43	7	+ 5·0	+ 1·4	+ 2·68
20	+ 3·5	+ 1·7	+ 2·50	8	+ 8·6	+ 0 6	+ 4·82
21	+ 2·6	+ 1·5	+ 2·07	9	+ 1·8	+ 0·4	+ 0·97
22	+ 3·0	+ 1·5	+ 2·28	10	+ 1·4	+ 0·5	+ 0·90
23	+ 4·1	+ 1·8	+ 3·00	11	+ 1·4	+ 0·6	+ 1·00
24	+ 6·8	+ 0·9	+ 3·18	12	+ 9·0	+ 0·5	+ 4·73
25	+ 4 4	+ 0·4	+ 2·30	13	+ 6·5	+ 3·7	+ 5·03
26	+ 3·8	+ 0·6	+ 1·77	14	+ 5·4	+ 1·8	+ 3·63
27	+ 1·4	+ 0·7	+ 1·02	15	+ 1·6	+ 0·6	+ 1·13
28	+ 2·1	+ 0·2	+ 0·92	16	+ 3·0	+ 0·6	+ 1·52
29	+ 0·9	− 1·0	− 0·12	17	+ 11·5	+ 3·8	+ 7·80
30	+ 1·0	− 1·8	− 0·27	18	+ 9·2	+ 6·2	+ 7·52

The figures in the maximum column, it will be seen, are by no means very high. That the enormous covering of snow, which the north winds had heaped on the beach, could disappear so rapidly notwithstanding this low temperature probably depends on this, that a large portion of the heat which the solar rays bring with them acts directly in melting the snow without sun-warmed air being used as an intermediate agent or heat-carrier, partly also on the circumstance that the winds prevailing in spring come from the sea to the southward, and before they reach the north coast pass over considerable mountain heights in the interior of the country. They have therefore the nature of *föhn* winds, that is to say, the whole mass of air, which

the wind carries with it, is heated, and its relative humidity is slight, because a large portion of the water which it originally contained has been condensed in passing over the mountain heights. Accordingly when the dry *föhn* winds prevail, a considerable evaporation of the snow takes place. The slight content of watery vapour in the atmosphere diminishes its power of absorbing the solar heat, and instead increases that portion of it which is found remaining when the sun's rays penetrate to the snowdrifts, and there conduce, not to raise the temperature, but to convert the snow into water.[1]

The aurora is, as is well-known, a phenomenon at the same time cosmic and terrestrial, which on the one hand is confined within the atmosphere of our globe and stands in close connection with terrestrial magnetism, and on the other side is dependent on certain changes in the envelope of the sun, the

[1] In Lapland, too, the melting of the snow in spring is brought about in no inconsiderable degree by similar causes, *i.e.* by dry warm winds which come from the fells. On this point the governor of Norbotten län, H. A. Widmark, has sent me the following interesting letter:—

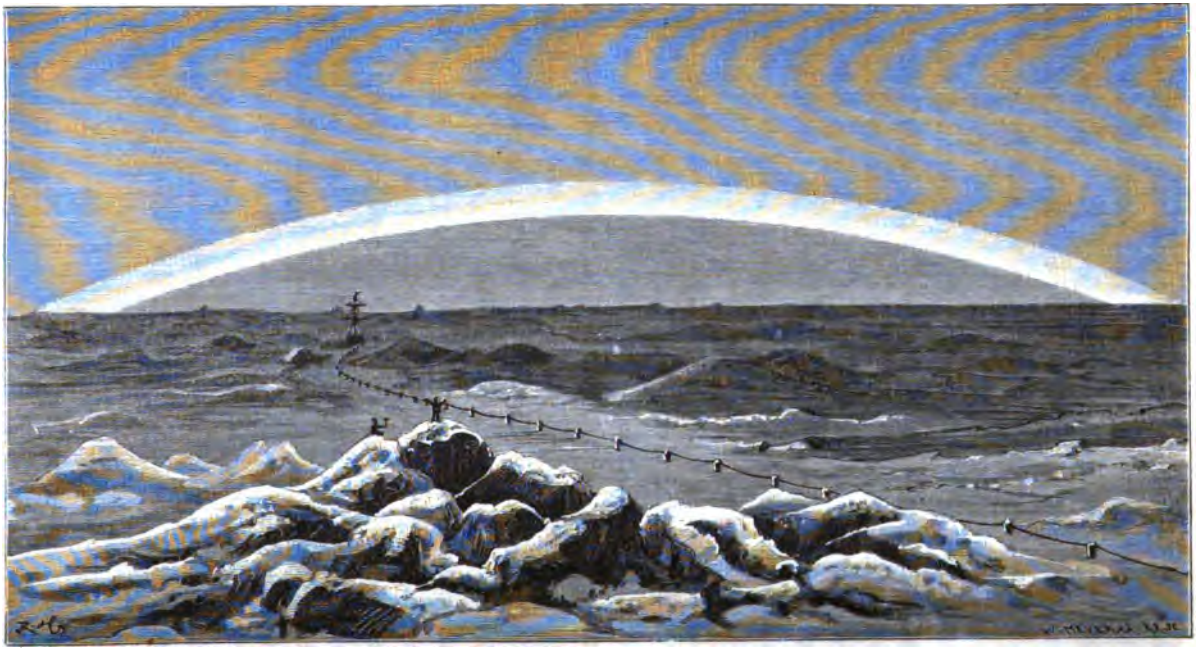
"However warm easterly and southerly winds may be in the parts of Swedish Lapland lying next the Kölen mountains, they are not able in any noteworthy degree to melt the masses of snow which fall in those regions during the winter months. On the other hand there comes every year, if we may rely on the statements of the Lapps, in the end of April or beginning of May, from the west (*i.e.* from the fells), a wind so strong and at the same time so warm, that in quite a short time—six to ten hours—it breaks up the snow-masses, makes them shrink together, forces the mountain sides from their snow covering, and changes the snow which lies on the ice of the great fell lakes to water. I have myself been out on the fells making measurements on two occasions when this wind came. On one occasion I was on the Great Lule water in the neighbourhood of the so-called Great Lake Fall. The night had been cold but the day became warm. Up to 1 o'clock P.M. it was calm, but immediately after the warm westerly wind began to blow, and by 6 o'clock P.M. all the snow on the ice was changed to water, in which we went wading to the knees. The Lapps in general await these warm westerly winds before they go to the fells in spring. Until these winds begin there is no pasture there for their reindeer herds."

nature of which is as yet little known, and which are indicated by the formation of spots on the sun; the distinguished Dutch physicist, VON BAUMHAUER, has even placed the occurrence of the aurora in connection with cosmic substances which fall in the form of dust from the interstellar spaces to the surface of the earth. This splendid natural phenomenon besides plays, though unjustifiably, a great *rôle* in imaginative sketches of winter life in the high north, and it is in the popular idea so connected with the ice and snow of the Polar lands, that most of the readers of sketches of Arctic travel would certainly consider it an indefensible omission if the author did not give an account of the aurora as seen from his winter station. The scientific man indeed knows that this neglect has, in most cases, been occasioned by the great infrequency of the strongly luminous aurora just in the Franklin archipelago on the north coast of America, where most of the Arctic winterings of this century have taken place; but scarcely any journey of exploration has at all events been undertaken to the uninhabited regions of the high north, which has not in its working plan included the collection of new contributions towards clearing up the true nature of the aurora and its position in the heavens. But the scientific results have seldom corresponded to the expectations which had been entertained. Of purely Arctic expeditions, so far as I know, only two, the Austrian-Hungarian to Franz Josef Land (1872-74) and the Swedish to Mussel Bay (1872-73), have returned with full and instructive lists of auroras.[1] ROSS, PARRY, KANE, MCCLINTOCK, HAYES, NARES, and others, have on the

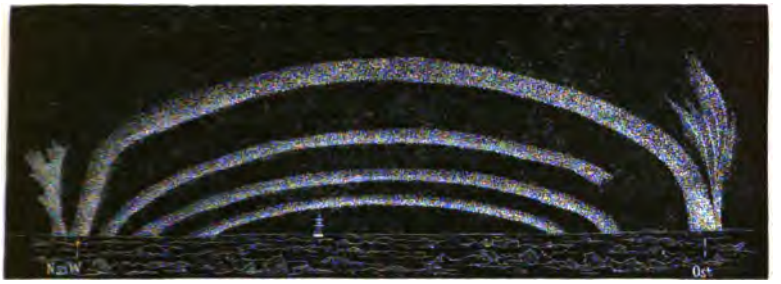
[1] I do not include *La Recherché's* wintering in 1838-39 at Bosekop, in the northernmost part of Norway, as it took place in a region which is all the year round inhabited by hundreds of Europeans. During this expedition very splendid auroras were seen, and the studies of them by LOTTIN, BRAVAIS, LILLIEHÖÖK, and SILJESTRÖM, are among the most important contributions to a knowledge of the aurora we possess, while we have to thank the draughtsmen of the expedition for exceedingly faithful and masterly representations of the phenomenon.

other hand only had opportunities of registering single auroras; the phenomenon in the case of their winterings has not formed any distinctive trait of the Polar winter night. It was the less to be expected that the *Vega* expedition would form an exception in this respect, as its voyage happened during one of the years of which we knew beforehand that it would be a minimum aurora year. It was just this circumstance, however, which permitted me to study, in a region admirably suited for the purpose, a portion of this natural phenomenon under uncommonly favourable circumstances. For the luminous arcs, which even in Scandinavia generally form starting-points for the radiant auroras, have here exhibited themselves undimmed by the more splendid forms of the aurora. I have thus, undisturbed by subsidiary phenomena, been able to devote myself to the collection of contributions towards the ascertaining of the position of these luminous arcs, and I believe that I have in this way come to some very remarkable conclusions, which have been developed in detail in a separate paper printed in *The Scientific Work of the Vega Expedition* (Part I. p. 400). Here space permits me only to make the following statement.

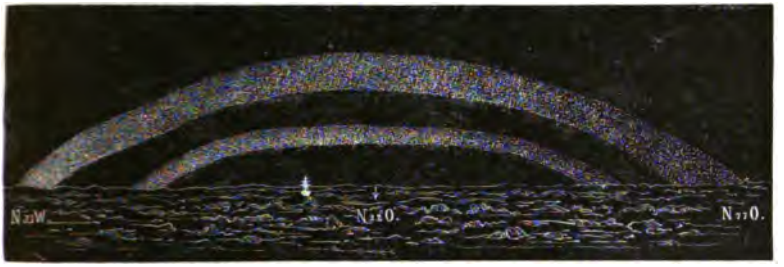
The appearance of the aurora at Behring's Straits in 1878-79 is shown in the accompanying woodcuts. We never saw here the magnificent bands or draperies of rays which we are so accustomed to in Scandinavia, but only halo-like luminous arcs, which hour after hour, day after day, were unaltered in position. When the sky was not clouded over and the faint light of the aurora was not dimmed by the rays of the sun or the full moon, these arcs commonly began to show themselves between eight and nine o'clock P.M., and were then seen without interruption during midwinter till six, and farther on in the year to three o'clock in the morning. It follows from this that the aurora even during a minimum year is a permanent natural phenomenon. The nearly unalterable position of the arcs has further rendered possible a number of measurements of its



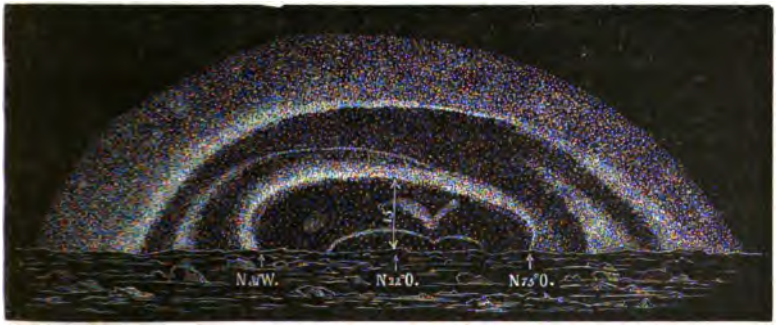
THE COMMON AURORA-ARC AT THE "VEGA'S" WINTER QUARTERS.



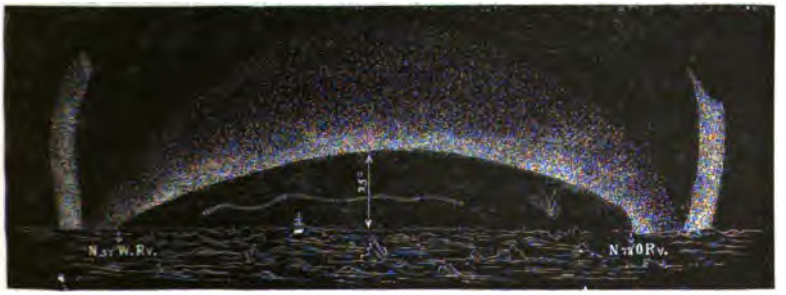
AURORA AT THE "VEGA'S" WINTER QUARTERS, 3RD MARCH, 1879, AT 9 P.M.



DOUBLE AURORA-ARCS SEEN 20TH MARCH, 1879, AT 9.30 P.M.



ELLIPTIC AURORA SEEN 21ST MARCH, 1879, AT 2 15 A.M.



ELLIPTIC AURORA SEEN 21ST MARCH, 1879, AT 3 A.M.

height, extent, and position from which I believe I may draw the following inferences: that our globe even during a minimum aurora year is adorned with an almost constant, single, double, or multiple luminous crown, whose inner edge is situated at a height of about 200 kilometres or 0·03 radius of the earth above its surface, whose centre, "the aurora-pole," lies somewhat under the earth's surface, a little north of the magnetic-pole, and which, with a diameter of 2,000 kilometres or 0·3 radius of the earth, extends in a plane perpendicular to the radius of the earth, which touches the centre of the circle.

I have named this luminous crown *the aurora glory* on account of its form and its resemblance to the crown of rays round the head of a saint. It stands in the same relation to the ray and drapery auroras of Scandinavia as the trade and monsoon winds in the south to the irregular winds and storms of the north. The light of the crown itself is never distributed into rays, but resembles the light which passes through obscured glass. When the aurora is stronger, the extent of the light-crown is altered: double or multiple arcs are seen, generally lying in about the same plane and with a common centre, and rays are cast between the different arcs. Arcs are seldom seen which lie irregularly to or cross each other.

The area in which the common arc is visible is bounded by two circles drawn upon the earth's surface, with the aurora-pole for a centre and radii of 8° and 28° measured on the circumference of the globe. It touches only to a limited extent countries inhabited by races of European origin (the northernmost part of Scandinavia, Iceland, Danish Greenland), and even in the middle of this area there is a belt passing over middle Greenland, South Spitzbergen, and Franz Josef Land, where *the common arc* forms only a faint, very widely extended, luminous veil in the zenith, which perhaps is only perceptible by the winter darkness being there considerably diminished. This belt divides the regions where these luminous arcs are seen principally to the south from

those in which they mainly appear on the northern horizon. In the area next the aurora-pole only the smaller, in middle Scandinavia only the larger, more irregularly formed luminous crowns are seen. But in the latter region, as in southern British America, aurora storms and ray and drapery auroras are instead common, and these appear to lie nearer the surface of the earth than the arc aurora. Most of the Polar expeditions have wintered so near the aurora-pole that *the common aurora arc* there lay under or quite near the horizon, and as the ray aurora appears to occur seldom within this circle, the reason is easily explained why the winter night was so seldom illuminated by the aurora at the winter quarters of these expeditions, and why the description of this phenomenon plays so small a part in their sketches of travel.

SONG-BIRDS IN THE RIGGING OF THE "VEGA." May 1879.

Long before the ground became bare and mild weather commenced, migratory birds began to arrive: first the snow-bunting on the 23rd April, then large flocks of geese, eiders, long-tailed ducks, gulls, and several kinds of waders and song-birds. First among the latter was the little elegant *Sylvia Ewersmanni*, which in the beginning of May settled in great flocks on the only dark spot which was yet to be seen in the quarter —the black deck of the *Vega*. All were evidently much exhausted, and the first the poor things did was to look out convenient sleeping places, of which there is abundance in the rigging of a vessel when small birds are concerned. I need

scarcely add that our new guests, the forerunners of spring, were disturbed on board as little as possible.

We now began industriously to collect material for a knowledge of the avi- and mammal-fauna of the region. The collections, when this is being written, are not yet worked out, and I can therefore only make the following statement on this point:

From the acquaintance I had made during my own preceding journeys and the study of others', with the bird-world of the high north, I had got the erroneous idea that about the same species of birds are to be met with everywhere in the Polar lands of Europe, Asia, and America. Experience gained during the expedition of the *Vega* shows that this is by no means the case, but that the north-eastern promontory of Asia, the Chukch peninsula, forms in this respect a complete exception. Birds occur here in much fewer numbers, but with a very much greater variety of types than on Novaya Zemlya, Spitzbergen, and Greenland; in consequence of which the bird-world on the Chukch peninsula has in its entirety a character differing wholly from that of the Atlantic Polar lands. We indeed meet here with types closely allied to the glaucous gull (*Larus glaucus*, Brünn.), the ivory gull (*L. eburneus*, Gmel.), the kittiwake (*L. tridactylus*, L.), the long-tailed duck (*Harelda glacialis*, L.), the king duck (*Somateria spectabilis*, L.),[1] the phalarope (*Phalaropus fulicarius*, Bonap.), the purple sandpiper (*Tringa maritima*, Brünn.), &c., of Spitzbergen and Novaya Zemlya; but along with these are found here many peculiar species, for instance the American eider (*Somateria V.-nigrum*, Gray), a swanlike goose, wholly white with black wing points (*Anser hyperboreus*, Pall.), a greyish-brown goose with bushy yellowish-white feather-covering on the head (*Anser pictus*, Pall.), a species of Fuligula, elegantly coloured on the head in velvet-black, white, and green, (*Fuligula Stelleri*, Pall.), the

[1] The common eider (*S. mollissima*, L.) is absent here, or at least exceedingly rare.

beautifully marked, scarce *Larus Rossii*, Richards, of which Dr. Almquist on the 1st July, 1879, shot a specimen from the vessel, a little brown sandpiper with a spoonlike widened bill-point (*Eurynorhynchus pygmæus*, L.), and various song-birds not found in Sweden, &c. Besides, a number of the Scandinavian-types living here also, according to Lieutenant Nordquist, are distinguished by less considerable differences in colour-marking and size. The singular spoon-billed sandpiper was at one time in spring so common that it was twice served at the gunroom table, for which after

SPOON-BILLED SANDPIPER FROM CHUKCH LAND.
Eurynorhynchus pygmæus, L.
At the side the bird's bill seen from above, of the natural size.

our return home we had to endure severe reproaches from animal collectors. This bird is found only in some few museums. It was first described by LINNÆUS in *Museum Adolphi Friderici, Tomi secundi prodromus*, Holmiæ 1764, and then by C. P. THUNBERG in the *Transactions* of the Swedish Academy of Sciences for 1816 (p. 194), where it is stated that the homeland of this bird is tropical America. It has since been caught a few times in south-eastern Asia. Probably, like *Sylvia Ewersmanni*, it passes the winter in the Philippine group of islands, but in

summer visits the high north. Like several other birds which appeared in spring with the first bare spots it disappeared in July. Perhaps it retired to the interior to breed in the bush, or, which is more probable, went farther north to the islands or continents not yet discovered by Europeans, which in all probability connect Wrangel Land with the Franklin Archipelago.

The higher animal forms which, along with the Polar traveller, dare to brave the cold and darkness of the Arctic night, exert on him a peculiar attraction. Regarding these, Lieutenant Nordquist has given me the following notes:—

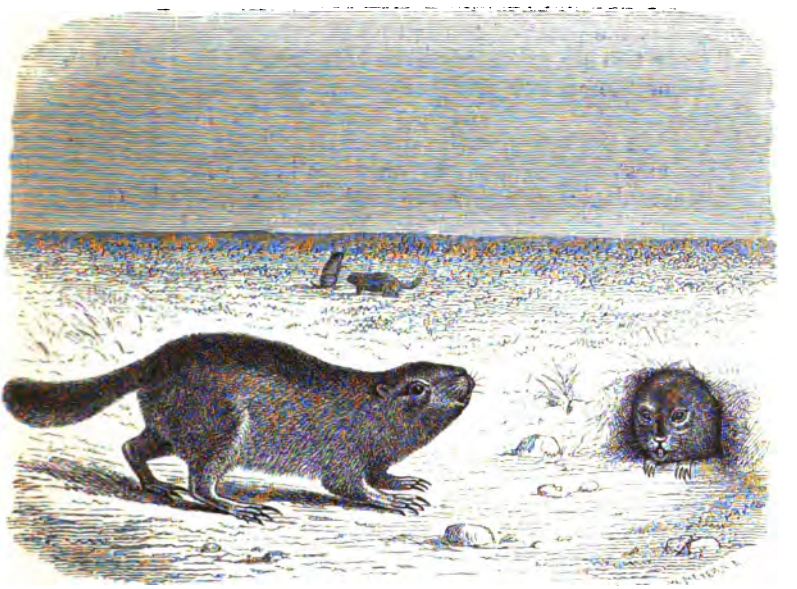
"The mammal most common in winter on the north coast of the Chukch peninsula is the *hare*. It differs from the fell hare (*Lepus borealis*, Lillj.) by its larger size, and by the bones of its nose not tapering so rapidly. It is generally met with in flocks of five or six on the hills in the neighbourhood of the tents, which are covered only with a thin layer of snow, notwithstanding the large number of hungry dogs which wander about there.

"The *mountain foxes* (*Vulpes lagopus*, L.) are very numerous. The common *fox* (*Vulpes vulgaris*, Gray) appears also to be common. A red fox, which Lieutenant Brusewitz shot from the vessel in October, differed considerably from the common fox, and approached the mountain fox. The food of the fox appears in winter to consist of hares, ptarmigan, and lemmings. I have twice seen holes in the snow about a metre deep and at the mouth not more than thirty centimetres wide, which the Chukches said were excavated by foxes searching for lemmings.

"Of the *lemming* I have seen three varieties, viz. *Myodes obensis*, *M. torquatus*, and *Arvicola obscurus*. There is found here, also, according to the statements of the Chukches, a little mouse, in all probability a Sorex. *Myodes torquatus* were got the first time on the 12th January, *Myodes obensis* on the 13th February. Both species were afterwards frequently brought on board by Chukches, and during the winter lemmings were seen not unfrequently running on the snow. *Myodes obensis* appeared to be more numerous than the other species. It is singular that all the nine specimens of *Myodes torquatus* I obtained during the winter were males. Differing from both these species, *Arvicola obscurus* does not appear to show itself above the snow during winter. Of the latter I got eight specimens from the village

Tjapka, lying between Yinretlen and Behring's Straits. I afterwards got another from the village Irgunnuk, situated five English miles east of Yinretlen.

"The more uncommon land mammals wintering in these regions are the *wolf* and the *wild reindeer*. Footprints of the latter were seen on the 23rd March, in the mountain region, fifteen to twenty miles south of Yinretlen. According to the Chukches' account some few reindeer remain on the hills along the coast, while the greater number migrate southwards towards



MARMOTS FROM CHUKCH LAND.

winter. Besides these, two other mammals live here during winter, though they are only seen during summer and autumn, because they hibernate the rest of the time. These are the *land bear* and the *marmot* (*Arctomys sp.*). We saw no land bear, but on the 8th October Lieutenant Hovgaard and I found traces of this animal two or three English miles from the coast. The Chukches say that the land bear is not uncommon in summer. The marmot occurs in large numbers. It was brought on board for the first time by a Chukch, and the following day

I myself saw it sitting on the top of a little hill, where it had its dwelling.

"Besides the animals enumerated above the natives talked of another, which is called by them *nennet*, and is said to live by the banks of rivers. According to their description it appears to be the common *otter*. As at most places where the lemming is common the *weasel* (*Mustela vulgaris*, Briss.) is also found here. I got from the Chukches two skins of this animal. Whether the beaver occurs in the part of Chukch Land which we visited I cannot say with certainty. It is probable, because the Chukches informed me that there was found here a weasel which has the point of the tail black.

"Only two sea mammals have been seen in this region in the course of the winter, viz. the *rough* or *bristled seal* and the *Polar bear*. On two occasions traces of the latter have been observed in the neighbourhood of land. They appear, however, for the most part to keep by openings in the ice farther out to sea, where during our stay two of them were killed by Chukches from the neighbouring villages. The rough seal is probably the only species that occurs near the coast during winter. It is caught in great numbers, and forms, along with fish and various vegetable substances, the main food of the Chukches.

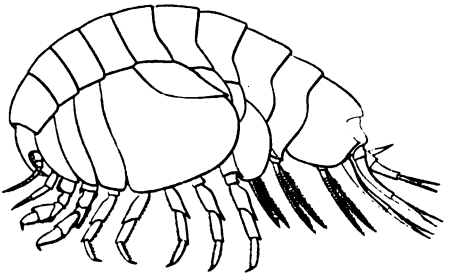
"Of land birds there winter in the region only three species, viz. an *owl* (*Strix nyctea*, L.), a *raven* (*Corvus sp.*), and a *ptarmigan* (*Lagopus subalpina*, Nilss.); the last-named is the most common. On the 14th December, during a sledge journey into the country I saw, about ten or twelve English miles from the coast, two large coveys of ptarmigan, one of which probably numbered over fifty. Nearer the coast, on the other hand, there were found, especially during spring, for the most part only single birds. The raven is common at the Chukch villages, and builds its nest in the neighbouring cliffs. The first egg was got on the 31st May. The mountain owl was seen for the first time on the 11th March, but, according to the statements of the Chukches, it is to be met with during the whole winter. In April and May we also saw some mountain owls; on the 21st May I saw two.

"At open places in the sea there are found here in winter, the Chukches say, two swimming birds, the *loom* (*Uria Brünnichii*, Sabine) and the *black guillemot* (*Uria grylle*, L.). Of the former we obtained two specimens for the first time on the 1st May, of the latter on the 19th of the same month. Possibly there winter in open places of the sea besides these birds a species of Mergulus, one of which came to the winter quarters of the *Vega* on the 3rd November, and a Fuligula, a

specimen of which was sold to us on the 9th March by a Chukch, who said he had killed it at a clearing off the coast."

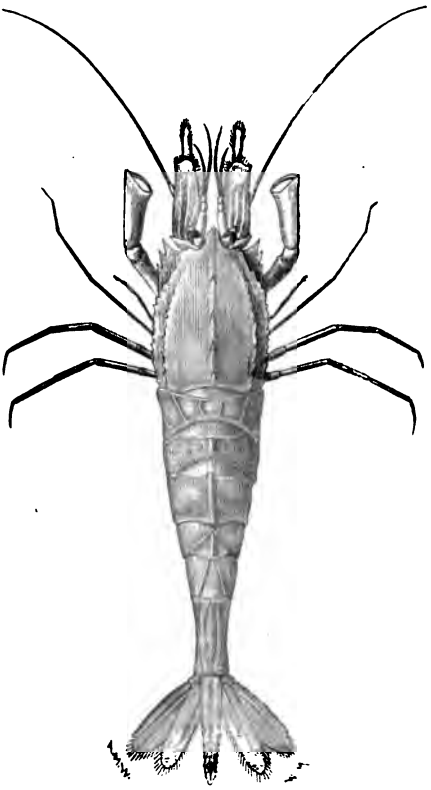
After the arrival of the migratory birds hunting excursions began to form a welcome interruption in our monotonous winter life, and the produce of the hunting a no less agreeable change from the preserved provisions. The Chukches besides offered us daily a large number of different kinds of birds, especially when they observed that we paid a higher price for many rare kinds of birds, though small and of little use for food, than for a big, fat goose. The Chukches killed small birds either by throwing stones, or by shooting them with bow and arrows, in connection with which it may be observed that most of them were very poor archers. They also caught them with whale-bone snares set on bare spots on the beach, generally between two vertebræ of the whale. For pebbles are very scarce, but the bones of the whale are found, as has been already stated, at most places in large numbers on the strand-banks where the tents are pitched. In June we began to get eggs of the gull, eider, long-tailed duck, goose, and loom, in sufficient number for table use. The supply, however, was by no means so abundant as during the hatching season on Greenland, Spitzbergen, or Novaya Zemlya.

A little way from the vessel there were formed, in the end of May, two "leads," a few fathoms in breadth. On the 31st May I sent some men to dredge at these places. They returned with an abundant yield, but unfortunately the openings closed again the next day, and when I and Lieutenant Bove visited the place there was a large, newly-formed *toross* thrown up along the edge of the former channel. Another "lead" was formed some days after, but closed again through a new disturbance of the position of the ice, a high ice-rampart, formed of loose blocks, heaped one over another, indicating the position of the



STEGOCEPHALUS KESSLERI (STUXB).

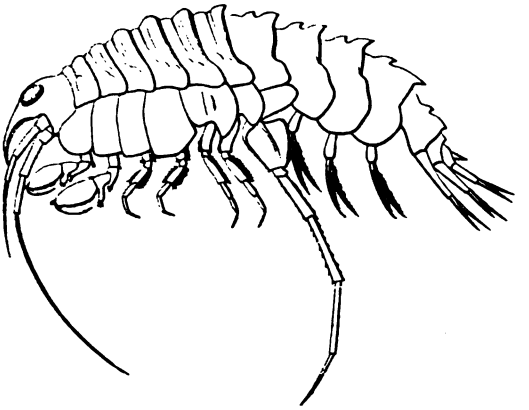
Natural size.



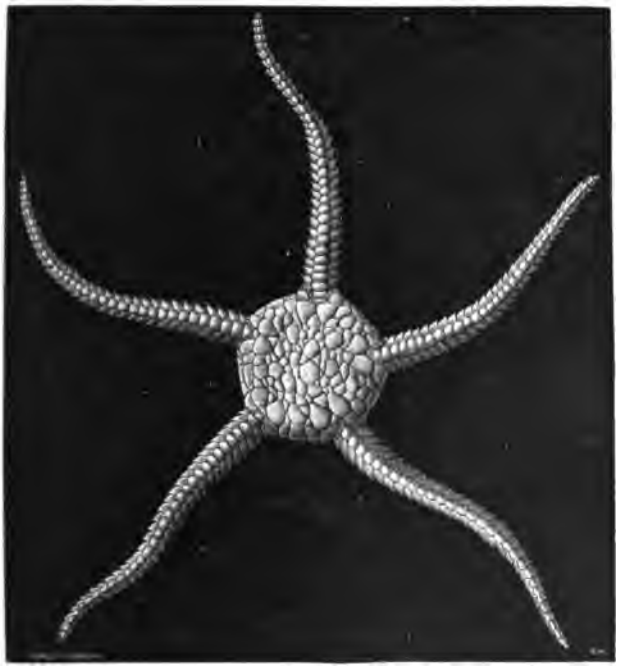
SABINEA SEPTEMCARINATA (SABINE).

Natural size.

INVERTEBRATES FROM THE SEA AT THE 'VEGA'S" WINTER QUARTERS.



ACANTHOSTEPHIA MALMGRENI, (GOËS.).
Magnified twice.



OPHIOGLYPHA NODOSA, (LÜTKEN.).
Magnified twice.

former opening. Even the strongest vessel would have been crushed in such a channel by the forcing together of the ice. Of a different sort from both these occasional leads was an extensive opening, which showed itself a kilometre or two north of the vessel. It is probable that with few interruptions, which, however, might have been difficult to pass, it extended as far as Behring's Straits, where, according to the statements of the Chukches, several whalers had already made their appearance. Round the vessel itself, however, the ice still lay fast and unbroken. Nor did the Chukches appear to expect that it would break up very soon, to judge by the number of vehicles drawn by dogs or reindeer which still passed us, both to the east and west. One of these travellers must here be specially mentioned, as his journey has been talked about as an expedition sent to our relief.

It was the 19th June. A large number of Chukches travelling past us as usual came on board, partly to receive the tribute of hospitality to which they considered themselves entitled, partly to satisfy an easily understood curiosity and gossip a little about the most important occurrences of the preceding day. One of them, a middle-aged man, whom we had not seen before, with a friendly and self-satisfied bearing, whose face was a mere collection of wrinkles, and over whose *pesk* was drawn an old velvet shirt, presented himself with a certain pretentiousness as the chief NOAH ELISEJ. Since the mistake with the stately Chepurin, and since even Menka's supposed slave declared himself to be at least as good as Menka, we had begun to be rather indifferent to the rank of chief among the Chukches. Noah Elisej however, notwithstanding he thus brought forward his pretensions, was received like a common man, at which he appeared to be a little offended. But our behaviour soon changed, when Notti, or some other of our daily guests, who had become quite familiar with our fancies, tastes and weaknesses, informed us that Noah Elisej had with him a

large, a very large letter. Old Noah thus carried a mail, perhaps a European mail. At once he became in our eyes a man of importance. After being stormed for a time with questions, he took from a bag which hung from his neck the ordinary pieces of board fastened together, which here serve as a postbag. They were found however to contain only a letter of a couple of lines from a Russian official at Nischni Kolymsk, without any news

NOAH ELISEJ.
(After a photograph by L. Palander.)

from Europe, but informing us that chief Noah Elisej was sent to us to assist us, if necessary. Noah first patted his stomach to indicate that he was hungry and wanted food, and hawked and pointed with his finger at his throat to let us know that a *ram* would taste well. He then told us something which we did not then exactly understand, but which we now have reason to interpret as a statement that Noah was the leader of an expedition

sent by the Siberian authorities to our relief, and that he was therefore willing in return for suitable compensation to give us some reindeer. I availed myself of the offer, and purchased three animals for sugar, tea, and a little tobacco. Noah besides was a friendly and easy-going man, who, Christian though he was, travelled about with two wives and a large number of children, who all of course would see the vessel and get their treat of tobacco, clay pipes, sugar, *ram*, &c.

So much flood water had now begun to collect on the ice, especially near the land, that it was exceedingly difficult to walk from the vessel to the shore and back. Many a proposed land excursion was broken off by somebody, immediately after leaving the vessel, sinking into some deep hole in the ice and thus getting a cold bath. Excursions on land however began to be exceedingly interesting to the botanists and zoologists; and therefore to avoid the inconveniences mentioned I caused a tent to be pitched by the side of the large lagoon between Pitlekaj and Yinretlen, and a light boat to be carried thither. The bottom of the lagoon was still filled with ice, above which however the water stood so high that the boat floated in it. The naturalists settled by turns in the tent, and from it made excursions in different directions, as I hope with the result that the neighbourhood of Pittekaj is now the best known tract on the north of Asia, which after all is not saying much. The first plant in flower (*Cochlearia fenestrata*, R. Br.) was seen on the 23rd June.[1] A week after the ground began to grow green and flowers of different kinds to show themselves in greater and greater numbers.[2] Some flies were

[1] During the expedition of 1861, when we were shut up by ice in Treurenberg Bay on Spitzbergen (79° 57′ N.L.) the first flower (*Saxifraga oppositifolia*, L.), was pulled on the 22nd June. After the wintering in 1872-73, Palander and I during our journey round North-east Land, saw the first flower on the same species of saxifrage as early as the 15th June, in the bottom of Wahlenberg Bay (79° 46′ N.L.).

[2] For the sake of completeness, I shall here also enumerate the plants

seen on a sunshiny day in May (the 27th) in motion on the surface of the snow, but it was not until the end of June that

which Dr. Kjellman found at Pitlekaj. Those marked with an * either themselves occur in Scandinavia or are represented by nearly allied forms.

Leucanthemum arcticum (L.) DC.
Artemisia arctica LESS.
* „ vulgaris L. f. Tilesii LEDEB.
Cineraria frigida RICHARDS.
* „ palustris L. f. congesta HOOK.
* Antennaria alpina (L.) R. BR. f. Friesiana TRAUTV.
* Petasites frigida.
* Saussurea alpina (L.) DC. f. angustifolia (DC.)
* Taraxacum officinale WEB.
Valeriana capitata PALL.
Gentiana glauca PALL.
Pedicularis sudetica WILLD.
„ Langsdorffii FISCH.
„ lanata WILLD. f. leiantha TRAUTV.
„ capitata ADAMS.
* Polemonium cœruleum L.
* Diapensia lapponica L.
* Armeria sibirica TURCZ.
Primula nivalis PALL. f. pygmæa LEDEB.
„ borealis DUBY.
* Loiseleuria procumbens (L.) DESV.
* Ledum palustre L. f. decumbens AIT.
* Vaccinium vitis idæa L.
* Arctostaphylos alpina (L.) SPRENG.
* Cassiope tetragona (L.) DON.
Hedysarum obscurum L.
Oxytropis nigrescens (PALL.) FISCH. f. pygmæa CHAM.
species?
* Rubus Chamæmorus L.
* Comarum palustre L.
Potentilla fragiformis L. f. parviflora TRAUTV. f. villosa (PALL.)
* Sibbaldia procumbens L.
* Dryas octopetala L.
Spiræa betulæfolia PALL. f. typica MAXIM.
* Hippuris vulgaris L.
* Saxifraga stellaris L. f. comosa POIR.
„ punctata L.
* „ cernua L.
* „ rivularis L.
* Rhodiola rosea L.
* Empetrum nigrum L.
* Cardamine bellidifolia L.
Cochlearia fenestrata R. BR. f. typica MALMGR. f. prostata MALMGR.
Ranunculus Pallasii SEHLECHT
* „ nivalis L.
* „ pygmæus WG.
* „ hyperboreus ROTTB.
* Aconitum Napellus L. f. delphinifolia REICHENB.
Claytonia acutifolia WILLD.
* Wahlbergella apetala (L.) FR.
* Stellaria longipes GOLDIE. f. humilis FENZL.
* „ humifusa ROTTB.
Cerastium maximum L.
* „ alpinum L. f. hirsuta KOCH.
* Halianthus peploides (L.) FR.
Alsine arctica (STEV.) FENZL.
* Sagina nivalis (LINDBL.) FR.
* Polygonum Bistorta L.
* „ viviparum L.
„ polymorphum L. f. frigida CHAM.
Rumex arcticus TRAUTV.
* Oxyria digyna (L.) HILL.
Salix boganidensis TRAUTV. f. latifolia.

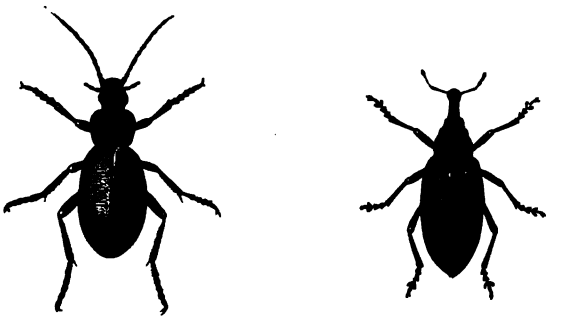
insects began to show themselves in any large numbers, among them many Harpalids, two large species of Carabus, and a large Curculionid. The insects occurring here however are not very numerous either in respect of species or individuals, which is not strange when we consider that the earth at a limited depth from the surface is constantly frozen. As even the shallow layer, which thaws in summer, is hard frozen in winter, all the insects which occur here must in one or other phase of their development endure being frozen solid for some time. But it may be remarked with reason with reference to this, that if life in an organism may so to speak be suspended for months by freezing stiff without being destroyed, what is there to prevent this suspension being extended over years, decades, or centuries?

The common idea, that all animal life ceases, when the interior animal heat sinks under the freezing-point of water, is besides not quite correct. This is proved by the abundant evertebrate life which is found at the bottom of the Polar Sea, even where the water all the year round has a temperature of $-2°$ to $-2°{\cdot}7$ C., and by the remarkable observation made during the wintering

Salix Chamissonis ANDERS.
„ arctica PALL.
„ cuneata TURCZ.
* „ reticulata L.
„ species?
Betula glandulosa MICHX. f. rotundifolia REGEL
Elymus mollis TRIN.
* Festuca rubra L. f. arenaria OSB.
* Poa flexuosa WG.
Arctophila effusa J. LGE.
Glyceria vilfoidea (ANDS.) TH. FR.
„ vaginata J. LGE. f. contracteta J. LGE.
* Catabrosa algida (SOL.) FR.
* Colpodium latifolium R. BR.
Dupontia Fischeri R. BR.
* Trisetum subspicatum (L.) P. B.
* Aira cæspitosa L. f. borealis TRAUTV.
Alopecurus alpinus SM.
* Hierochloa alpina (LILJEBL.) ROEM. and SCH.
* Carex rariflora (WG.) SM.
* „ aqvatilis f. epijegos LÆST.
* „ glareosa WG.
* „ lagopina WG.
* Eriophorum angustifolium ROTH.
* „ vaginatum L.
* „ russeolum FR.
* Luzula parviflora (EHRH.) DESV.
* „ Wahlenbergii RUPR.
* „ arcuata (WG.) SW. f. confusa LINDEB.
* Juncus biglumis L.
Lloydia serotina (L.) REICHENB.

at Mussel Bay in 1872–73, that small crustacea can live by millions in water-drenched snow at a temperature of from − 2° to − 10°·2 C. On this point I say in my account of the expedition of 1872–73 :—[1]

"If during winter one walks along the beach on the snow which at ebb is dry, but at flood tide is more or less drenched through by sea-water, there rises at every step one takes, an exceedingly intense, beautiful, bluish-white flash of light, which in the spectroscope gives a one-coloured labrador-blue spectrum. This beautiful flash of light arises from the snow, before completely dark, when it is touched. The flash lasts only a few



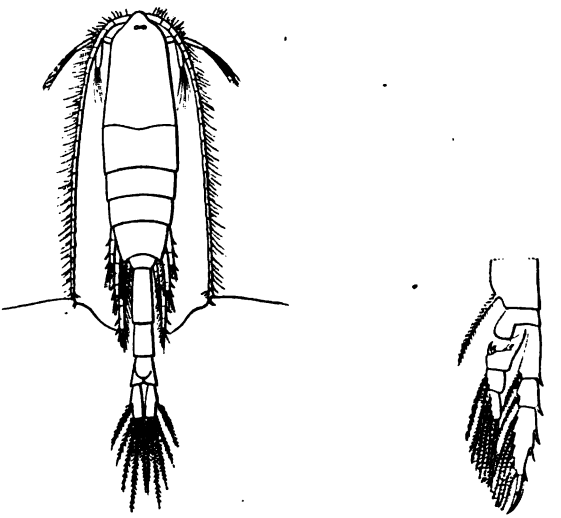
BEETLES FROM PITLEKAJ.

a. *Carabus truncaticollis* ESCHSCHOLTZ. (One and a half the natural size.)
b. *Alophus sp.* (One and two-thirds the natural size.)

moments after the snow is left untouched, and is so intense, that it appears as if a sea of fire would open at every step a man takes. It produces indeed a peculiar impression on a dark and stormy winter day (the temperature of the air was sometimes in the neighbourhood of the freezing-point of mercury) to walk along in this mixture of snow and flame, which at every step one takes splashes about in all directions, shining with a light so intense that one is ready to fear that his shoes or clothes will take fire."

[1] *Redogörelse för den svenska polarexpeditionen år* 1872-73. Bihang till Vet.-Akad. Handl. Bd. 2, No. 18, p. 52.

On a closer examination it appeared that this light-phenomenon proceeded from a minute crustacean, which according to the determination of Prof. W. LILLJEBORG belongs to the species *Metridia armata*, A. Boeck, and whose proper element appears to be snow-sludge drenched with salt water cooled considerably under 0° C. First when the temperature sinks below – 10° does the power of this small animal to emit light appear to cease. But as the element in which they live, the surface of the snow



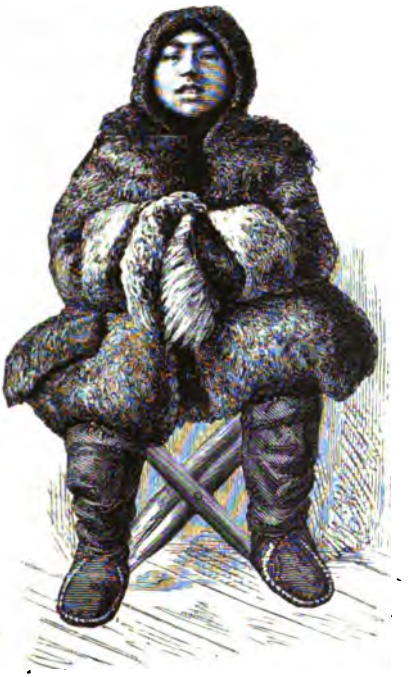
1. 2.

PHOSPHORESCENT CRUSTACEAN FROM MUSSEL BAY.
Metridia armata, A. Boeck.
1. A male magnified twelve times. 2. A foot of the second pair.

nearest the beach, is in the course of the winter innumerable times cooled twenty degrees more, it appears improbable that these minute animals suffer any harm by being exposed to a cold of from – 20° to – 30°, a very remarkable circumstance, as they certainly do not possess in their organism any means of raising the internal animal heat in any noteworthy degree above the temperature of the surrounding medium.

We did not see these animals at Pitlekaj, but a similar phenomenon, though on a smaller scale, was observed by Lieut. BELLOT[1] during a sledge-journey in Polar America. He believed that the light arose from decaying organic matter.

After the Chukches had told us that an exceedingly delicious black fish was to be found in the fresh-water lagoon at Yinretlen,



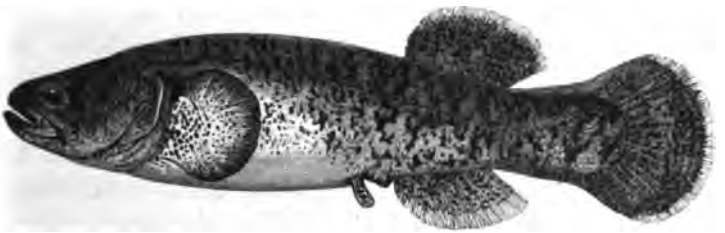
REITJNACKA.
(After a photograph by L. Palander.)

which is wholly shut off from the sea and in winter freezes to the bottom, we made an excursion thither on the 8th July. Our friends at the encampment were immediately ready to help us, especially the women, Aitanga, and the twelve-year-old, somewhat

[1] *Journal d'un Voyage aux Mers Polaires.* Paris, 1854. Pp. 177 and 223.

spoiled *Vega*-favourite Reitinacka. They ran hither and thither like light-hearted and playful children, to put the net in order and procure all that was needed for the fishing. We had carried with us from the vessel a net nine metres long and one deep. Along its upper border floats were fixed; to the lower was bound a long pole, to which were fastened five sticks, by which the pole was sunk to the bottom of the lagoon, a little way from the shore. Some natives wading in the cold water then pushed the net towards the land with sticks and the pole, which glided easily forward over the bottom of the lake, overgrown as it was with grass. In order to keep the fish from swimming away, the women waded at the sides of the net with their *pesks* much tucked up, screaming and making a noise, and now and then standing in order to indicate by a violent shaking that the water was very cold. The catch was abundant. We caught by hundreds a sort of fish altogether new to us, of a type which we should rather have expected to find in the marshes of the Equatorial regions than up here in the north. The fish were transported in a dog sledge to the vessel, where part of them was placed in spirits for the zoologists and the rest fried, not without a protest from our old cook, who thought that the black slimy fish looked remarkably nasty and ugly. But the Chukches were right: it was a veritable delicacy, in taste somewhat resembling eel, but finer and more fleshy. These fish were besides as tough to kill as eels, for after lying an hour and a half in the air they swam, if replaced in the water, about as fast as before. How this species of fish passes the winter is still more enigmatical than the winter life of the insects. For the lagoon has no outlet and appears to freeze completely to the bottom. The mass of water which was found in autumn in the lagoon therefore still lay there as an unmelted layer of ice not yet broken up, which was covered with a stratum of flood water several feet deep, by which the neighbouring grassy plains were inundated. It was in this flood water that the fishing took place.

After our return home the Yinretlen fish was examined by Professor F. A. SMITT in Stockholm, who stated, in an address which he gave on it before the Swedish Academy of Sciences, that it belongs to a new species to which Professor Smitt gave the name *Dallia delicatissima*. A closely allied form occurs in Alaska, and has been named *Dallia pectoralis*, Bean. These fishes are besides nearly allied to the dog-fish (*Umbra Krameri*, Fitzing), which is found in the Neusidler and Platten Lakes, and in grottos and other water-filled subterranean cavities in southern Europe. It is remarkable that the European species are considered uneatable, and even regarded with such loathing that the fishermen throw them away as soon as caught because they



DOG-FISH FROM THE CHUKCH PENINSULA.
Dallia delicatissima, Smitt.
Half the natural size.

consider them poisonous, and fear that their other fish would be destroyed by contact with it. They also consider it an affront if one asks them for dog-fish.[1] If we had known this we should not now have been able to certify that *Dallia delicatissima*, SMITT, truly deserves its name.

In the beginning of July the ground became free of snow, and we could now form an idea of how the region looked in summer in which we had passed the winter. It was not just attractive. Far away in the south the land rose with terrace-formed escarpments to a hill, called by us Table Mount, which

[1] Heckel and Kner, *Die Süsswasserfische Oesterreichs*, p. 295.

indeed was pretty high, but did not by any steep or bold cliffs yield any contribution to such a picturesque landscape border as is seldom wanting on the portions of Spitzbergen, Greenland, and the north part of Novaya Zemlya which I have visited; south Novaya Zemlya has at least at most places bold picturesque shore-cliffs. If I except the rocky promontory at Yinretlen, where a cliff inhabited by ravens rises boldly out of the sea, and some cliffs situated farther in along the beach of Kolyutschin Bay, the shore in the immediate neighbourhood of our wintering station consisted everywhere only of a low beach formed of coarse sand. Upon this sand, which was always frozen, there ran parallel with the shore a broad bank or dune, 50 to 100 metres broad, of fine sand, not water-drenched in summer, and accordingly not bound together by ice in winter. It is upon this dune that the Chukches erect their tents. Marks of them are therefore met with nearly everywhere, and the dune accordingly is everywhere bestrewed with broken implements or refuse from the chase. Indeed it may be said without exaggeration that the whole north-eastern coast of the Siberian Polar Sea is bordered with a belt of sweepings and refuse of various kinds.

The coarse sand which underlies the dune is, as has been stated, continually frozen, excepting the shallow layer which is thawed in summer. It is here that the "frost formation" of Siberia begins, that is to say, the continually frozen layer of earth, which, with certain interruptions, extends from the Polar Sea far to the south, not only under the treeless *tundra*, but also under splendid forests and cultivated corn-fields.[1] To

[1] Even pretty far south, in Scandinavia, there occur places with frozen earth which seldom thaws. Thus in Egyptinkorpi mosses in Nurmi and Pjeli parishes in Finland pinewoods are found growing over layers or "tufts" of frozen sand; but also, in other places in Eastern Finland, we find layers containing stumps, roots, &c., of different generations of trees, alternating with layers of frozen mould, according to a communication from the agronome Axel Asplund. A contribution to the knowledge

speak correctly, however, the frozen earth begins a little from the shore *under the sea*.[1] For on the coast the bottom often consists of hard frozen sand—"rock-hard sand," as the dredgers were accustomed to report. The frost formation in Siberia thus embraces not only terrestrial but also marine deposits, together with pure clear layers of ice, these last being formed in the mouths of rivers or small lakes by the ice of the river or lake frozen to the bottom being in spring covered with a layer of mud sufficiently thick to protect the ice from melting during summer. The frozen sea-bottom again appears to have been formed by the sand washed down by the rivers having carried with it when it sank some adhering water from the warm and almost fresh surface strata. At the sea-bottom the sand surrounded by *fresh* water freezing at 0° C. thus met a stratum of *salt* water whose temperature was two or three degrees under 0°, in consequence of which the grains of sand froze fast together. That it may go on thus we had a direct proof when in spring we sank from the *Vega* the bodies of animals to be skeletonised by the crustacea that swarmed at the sea-bottom. If the sack, pierced at several places, in which the skeleton was sunk was first allowed to fill with the slightly salt water from the surface and then sink rapidly to the bottom, it was found to be so filled with ice, when it was taken up a day or two afterwards, that the crustacea were prevented from getting at the flesh. We had already determined to abandon the convenient cleansing process, when I succeeded in finding means to avoid the inconvenience; this was attained by drawing the sack, while some distance under the surface, violently hither and thither

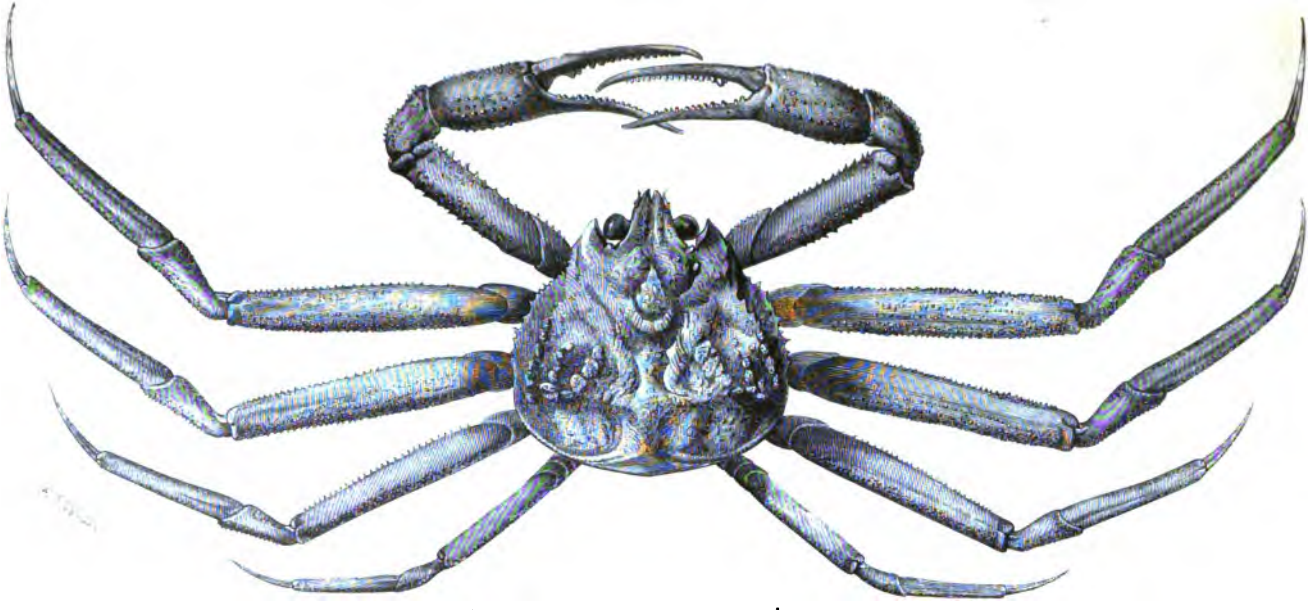
of the way, or one of the ways, in which such formations arise, we obtain from the known fact that mines with an opening to the air, so far south as the middle of Sweden, are filled in a few years with a coherent mass of ice if the opening is allowed to remain open. If it is shut the ice melts again, but for this decades are required.

[1] Middendorff already states that the bottom of the sea of Okotsk is frozen. (*Sibirische Reise*, Bd. 4, 1, p. 502.)

so that the surface water carried down with it was got rid of. Frozen clay and ooze do not appear to occur at the bottom of the Polar Sea. Animal life on the frozen sand was rather scanty, but algæ were met with there though in limited numbers.

From the shore a plain commences, which is studded with extensive lagoons and a large number of small lakes. In spring this plain is so water-drenched and so crossed by deep rapid snow-rivulets, that it is difficult, often impossible, to traverse it. Immediately after the disappearance of the snow a large number of birds at all events had settled there. The Lapp sparrow had chosen a tuft projecting from the marshy ground on which to place its beautiful roofed dwelling, the waders in the neighbourhood had laid their eggs in most cases directly on the water-drenched moss without trace of a nest, and on tufts completely surrounded by the spring floods we met with the eggs of the loom, the long-tailed duck, the eider and the goose. Already during our stay, the water ran away so rapidly, that places, which one day were covered with a watery mirror, over which a boat of light draught could be rowed forward, were changed the next day to wet marshy ground, covered with yellow grass-straws from the preceding year. At many places the grassy sward had been torn up by the ice and carried away, leaving openings sharply defined by right lines in the meadows, resembling a newly worked off place in a peat moss.

In summer there must be found here green meadows covered with pretty tall grass, but at the time of our departure vegetation had not attained any great development, and the flowers that could be discovered were few. I presume however that a beautiful Arctic flower-world grows up here, although, in consequence of the exposure of the coast-country to the north winds, poor in comparison with the vegetation in sheltered valleys in the interior of the country. There are found there too pretty high bushes, but on the other hand trees are represented at Pitlekaj only by a low species of willow which creeps along the ground.



CRAB FROM THE SEA NORTH OF BEHRING'S STRAITS.
Chionoecetes opilio, Kröyer.
Natural size.

We did not, however, see even this "wood" in full leaf. For in order that full summer heat may begin it is necessary,

TREE FROM PITLEKAJ.
Salix arctica, PALLAS. (Natural size.)

even here, that the ice break up, and this longed-for moment appeared to be yet far distant. The ice indeed

became clear of snow in the beginning of July, and thus the slush and the flood water were lessened, which during the preceding weeks had collected on its surface and made it very difficult to walk from the vessel to land. Now, again pretty dry-shod and on a hard blue ice-surface, we could make excursions in the neighbourhood of the vessel. We had however to be cautious. The former cracks had in many places been widened to greater or smaller openings by the flood water running down, and where a thin black object—a little gravel, a piece of tin from the preserved provision-cases, &c.—had lain on the ice there were formed round holes, resembling the seal-holes which I saw in spring laid bare after the melting of the snow on the ice in the fjords of Spitzbergen. The strength of the ice besides was nearly unaltered, and on the 16th July a heavily loaded double sledge could still be driven from the vessel to the shore.

On the 17th the "year's ice" next the land at last broke up, so that an extensive land clearing arose. But the ground-ices were still undisturbed, and between these the "year's ice" even lay so fast, that all were agreed that at least fourteen days must still pass before there was any prospect of getting free.

When on the 16th the reindeer-Chukch Yettugin came on board, and, talking of the collection of whale-bones in which we had been engaged some days before, informed us that there was a mammoth bone at his tent, and that a mammoth tusk stuck out at a place where the spring floods had cut into the bank of a river which flows from Table Mount to Riraitinop, I therefore did not hesitate to undertake an excursion to the place. Our absence from the vessel was reckoned at five or six days. It was my intention to go up the river in a skin boat belonging to Notti to the place where the mammoth tusk was, and thence to proceed on foot to Yettugin's tent. Yettugin assured us that the river was sufficiently deep for the flat-

bottomed boat. But when we had travelled a little way into the country it appeared that the river had fallen considerably during the day that Yettugin passed on the vessel. So certain was I however that the ice-barrier would not yet for a long time be broken up, that I immediately after my return from the excursion, which had thus been rendered unsuccessful, made arrangements for a new journey in order with other means of transport to reach the goal.

While we were thus employed the forenoon of the 18th passed. We sat down to dinner at the usual time, without any suspicion that the time of our release was now at hand. During dinner it was suddenly observed that the vessel was moving slightly. Palander rushed on deck, saw that the ice was in motion, ordered the boiler fires to be lighted, the engine having long ago been put in order in expectation of this moment, and in two hours, by 3.30 P.M. on the 18th July, the *Vega*, decked with flags, was under steam and sail again on the way to her destination.

We now found that a quite ice-free "lead" had arisen between the vessel and the open water next the shore, the ice-fields west of our ground-ices having at the same time drifted farther out to sea, so that the clearing along the shore had widened enough to give the *Vega* a sufficient depth of water. The course was shaped at first for the N.W. in order to make a *détour* round the drift-ice fields lying nearest us, then along the coast for Behring's Straits. On the height at Yinretlen there stood as we passed, the men, women, and children of the village all assembled, looking out to sea at the fire-horse—the Chukches would perhaps say fire-dog or fire-reindeer—which carried their friends of the long winter months for ever away from their cold, bleak shores. Whether they shed tears, as they often said they would, we could not see from the distance which now parted us from them. But it may readily have happened that the easily moved disposition of the savage led them to do this, Certain it is that in many of us the sadness of separation

mingled with the feelings of tempestuous joy which now rushed through the breast of every *Vega* man.

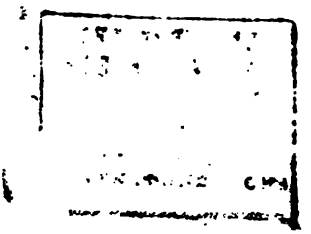
The *Vega* met no more ice-obstacles on her course to the Pacific. Serdze Kamen was passed at 1.30 A.M. of the 19th, but the fog was so dense that we could not clearly distinguish the contours of the land. Above the bank of mist at the horizon we could only see that this cape, so famous in the history of the navigation of the Siberian Polar Sea, is occupied by high mountains, split up, like those east of the Bear Islands, into ruin-like gigantic walls or columns. The sea was mirror-bright and nearly clear of ice, a walrus or two stuck up his head strangely magnified by the fog in our neighbourhood, seals swam round us in large numbers, and flocks of birds, which probably breed on the steep cliffs of Serdze Kamen, swarmed round the vessel. The trawl net repeatedly brought up from the sea-bottom a very abundant yield of worms, molluscs, crustacea, &c. A zoologist would here have had a rich working field.

The fog continued, so that on the other side of Serdze Kamen we lost all sight of land, until on the morning of the 20th dark heights again began to peep out. These were the mountain summits of the easternmost promontory of Asia, East Cape, an unsuitable name, for which I have substituted on the map that of Cape Deschnev after the gallant Cossack who for the first time 230 years ago circumnavigated it.

By 11 A.M. we were in the middle of the sound which unites the North Polar Sea with the Pacific, and from this point the *Vega* greeted the old and new worlds by a display of flags and the firing of a Swedish salute.

Thus finally was reached the goal towards which so many nations had struggled, all along from the time when Sir Hugh Willoughby, with the firing of salutes from cannon and with hurrahs from the festive-clad seamen, in the presence of an innumerable crowd of jubilant men certain of success, ushered in the long series of North-East voyages. But, as I have before

A. L. PALANDER.



related, their hopes were grimly disappointed. Sir Hugh and all his men perished as pioneers of England's navigation and of voyages to the ice-encumbered sea which bounds Europe and Asia on the north. Innumerable other marine expeditions have since then trodden the same path, always without success, and generally with the sacrifice of the vessel and of the life and health of many brave seamen. Now for the first time, after the lapse of 336 years, and when most men experienced in sea matters had declared the undertaking impossible, was the North-East Passage at last achieved. This has taken place, thanks to the discipline, zeal, and ability of our man-of-war's-men and their officers, without the sacrifice of a single human life, without sickness among those who took part in the undertaking, without the slightest damage to the vessel, and under circumstances which show that the same thing may be done again in most, perhaps in all years, in the course of a few weeks. It may be permitted us to say, that under such circumstances it was with pride we saw the blue-yellow flag rise to the mast-head and heard the Swedish salute in the sound where the old and the new worlds reach hands to each other. The course along which we sailed is indeed no longer required as a commercial route between Europe and China. But it has been granted to this and the preceding Swedish expeditions to open a sea to navigation, and to confer on half a continent the possibility of communicating by sea with the oceans of the world.

CHAPTER XII.

The history, physique, disposition, and manners of the Chukches.

THE north coast of Siberia is now, with the exception of its westernmost and easternmost parts, literally a desert. In the west there projects between the mouth of the Ob and the southern portion of the Kara Sea the peninsula of Yalmal, which by its remote position, its grassy plains, and rivers abounding in fish, appears to form the earthly paradise of the Samoyed of the present day. Some hundred families belonging to this race wander about here with their numerous reindeer herds. During winter they withdraw to the interior of the country or southwards, and the coast is said then to be uninhabited. This is the case both summer and winter, not only with Beli Ostrov and the farthest portion of the peninsula between the Ob and the Yenisej (Mattesol), but also with the long stretch of coast between the mouth of the Yenisej and Chaun Bay. During the voyage of the *Vega* in 1878 we did not see a single native. No trace of man could be discovered at the places where we landed, and though for a long time we sailed quite near land, we saw from the sea only a single house on the shore, viz., the before-mentioned wooden hut on the east side of Chelyuskin peninsula. Russian *simovies* and native encampments are indeed still found on the rivers some distance from their mouths, but the former coast population has withdrawn to

the interior of the country or died out,[1] and the north coast of Asia first begins again to be inhabited at Chaun Bay, namely, by the tribe with whom we came in contact during the latter part of the coast voyage of the *Vega* in 1878 and during the wintering.

I have already, it is true, given an account of various traits of the Chukches' disposition and mode of life, but I believe at all events that a more exhaustive statement of what the *Vega* men experienced in this region will be interesting to my readers, even if in the course of it I am sometimes compelled to return to subjects of which I have already treated.

[1] The north coast of America still forms the haunt of a not inconsiderable Eskimo population which, for a couple of centuries, has extended to the 80th degree of latitude. As the climate in the north part of the Old World differs little from that which prevails in corresponding regions of the New, as at both places there is an abundant supply of fish, and as the seal and walrus hunting—at least between the Yenisej and the Chatanga—ought to be as productive as on the north coast of America, this difference, which has arisen only recently, is very striking. It appears to me to be capable of explanation in the following way. Down to our days a large number of small savage tribes in America have carried on war with each other, the weaker, to escape extermination by the more powerful races, being compelled to flee to the ice deserts of the north, deeming themselves fortunate if they could there, in peace from their enemies, earn a living by adopting the mode of life of the Polar races, suitable as it is to the climate and resources of the land. The case was once the same in Siberia, and there are many indications that fragments of conquered tribes have been in former times driven up from the south, not only to the north coast of the mainland, but also beyond it to the islands lying off it. In Siberia, however, for the last 250 years, the case has been completely changed by the Russian conquest of the country. The pressure of the new government has, notwithstanding many single acts of violence, been on the whole less destructive to the original population than the influence which the Europeans have exerted in America. The Russian power has at least had a wholly beneficial influence, inasmuch as it has prevented the continual feuds between the native races. The tribes driven to the inhospitable North have been enabled to return to milder regions, and where this has not taken place they have, in the absence of new migrations from the South, succumbed in the fight with cold, hunger, and small-pox, or other diseases introduced by their new masters.

In West-European writings the race, which inhabits the north-easternmost portion of Asia, is mentioned for the first time, so far as I know, by WITSEN, who in the second edition of his work (1705, p. 671) quotes a statement by VOLODOMIR ATLASSOV, that the inhabitants of the northernmost portions of Siberia are called *Tsjuktsi*, without, however, giving any detailed description of the people themselves. In maps from the end of the seventeenth century names are still inscribed on this portion of land which were borrowed from the history of High Asia, as "Tenduc," "Quinsai," "Catacora," &c., but these are left out in VAN KEULEN'S atlas of 1709, and instead there stands here *Zuczari*. From about the same time we fall in with some accounts of the Chukches in the narrative of the distinguished painter CORNELIS DE BRUIN'S travels in Russia. A Russian merchant, MICHAEL OSTATIOF, who passed fourteen years in travelling in Siberia, gave de Bruin some information regarding the countries he had travelled through; among others he spoke of *Korakie* and *Soegtsie*. The latter were sketched as a godless pack, who worship the devil and carry with them their fathers' bones to be used in their magical arts. The same Russian who made these statements had also come in contact with "stationary" (settled) Soegtsi, so called "because they pass the whole winter hibernating, lying or sitting in their tents."[1] I have found the first somewhat detailed accounts of the race in the note on p. 110 of the under-quoted work, *Histoire généalogique des Tartares*, Leyden, 1726. They are founded on the statements of Swedish prisoners of war in Siberia.

The Russians, however, had made a much earlier acquaintance with the Chukches; for during their conquest of Siberia they came in contact with this race before the middle of the seventeenth century. A company of hunters in 1646 sailed down the

[1] Cornelis de Bruin, *Reizen over Moskovie, door Persie en Indie*, &c., Amsterdam, 1711, p. 12. The author's name is also written De Bruyn and Le Brun.

Kolyma river to the Polar Sea. East of the Kolyma they fell in with the Chukches, with whom they dealt in this way: they laid down their goods on the beach and then retired, on which the Chukches came thither, took the goods, and laid furs, walrus tusks, or carvings in walrus ivory, in their place.[1] How such journeys were repeated and finally led to the circumnavigation of the north-easternmost promontory of Asia belongs to a following chapter.

During these journeys the Russians often came in contact with the tribe which inhabited the north-eastern part of Asia, a contact which in general was not of a friendly nature. The bold hunters who contributed powerfully to the conquest of Siberia, and who even at their own hand entered into conflicts with whole armies from the heavenly empire, appear not to have behaved well when confronted with the warriors of the Chukch race. Even the attempts that were made with professional soldiers to conquer the land of the Chukches were without result, less however, perhaps, on account of the armed opposition which the Chukches made than from the nature of the country and the impossibility of even a small body of troops supporting themselves. The following may be quoted as examples of these campaigns which throw light upon the former disposition and mode of life of this tribe.

In 1701 some Yukagires who were tributary to Russia determined to make an attack on the Chukches, and requested from the commandant at Anadyrsk assistance against these enemies. A body of troops numbering twenty-four Russians and 110 Yukagires, was accordingly sent on a campaign along the coast

[1] Herodotus already states in book iv. chapter 196, that the Carthagenians bartered goods in the same way with a tribe living on the coast of Africa beyond the Gates of Hercules. The same mode of barter was still in use nearly two thousand years later, when the west coast of Africa was visited by the Venetian Cadamosto, in 1454 (*Ramusio*, i., 1588, leaf 100).

from Anadyrsk to Chukotskojnos. By the way they fell in with thirteen tents, inhabited by Chukches who owned no reindeer. The inhabitants were required to submit and pay tribute. This the Chukches refused to do, on which the Russians killed most of the men and took the women and children prisoners. The men who were not cut down killed one another, preferring death to the loss of freedom. Some days after there was another fight with 300 Chukches, which, however, was so unfortunate for the latter that 200 are said to have fallen. The rest fled, but returned next day with a force ten times as strong, which finally compelled the Russo-Yukagirean troop to return with their object unaccomplished.

A similar campaign on a small scale was undertaken in 1711, but with the same issue. On a demand for tribute the Chukches answered: "the Russians have before come to us to demand tribute and hostages, but this we have refused to give, and thus we also intend to do in future."[1]

About fifteen years after this resultless campaign the Cossack colonel AFFANASSEJ SCHESTAKOV proposed to the Government again to subdue this obstinate race, intending also to go over to the American side, yet known only by report, in order to render the races living there tributary to the Russians. The proposal was accepted. A mate, JACOB HENS, a land-measurer, MICHAEL GVOSDEV, an ore-tester, HERDEBOL, and ten sailors were ordered by the Admiralty to accompany the expedition. At Yekaterinenburg Schestakov was provided with some small cannon and mortars with ammunition, and at Tobolsk with 400 Cossacks. In consequence of a great number of misfortunes, among them shipwreck in the sea of Okotsk, there stood however but a small portion of this force at his disposal when he

[1] As security for the subjection of the conquered races, the Russians were accustomed to take a number of men and women from their principal families as hostages. These persons were called *amanates*, and were kept in a sort of slavery at the fixed winter dwellings of the Russians.

began his campaign by marching into the country from the bottom of Penschina Bay. This campaign too was exceedingly unfortunate. After only a few days' march he came unexpectedly on a large body of Chukches, who themselves had gone to war with the Koryäks. A fight took place on the $\frac{25}{14}$th March, 1730, in which Schestakov himself fell, hit by an arrow, and his followers were killed or put to flight.

Among those who were ordered to accompany Schestakov in this unfortunate campaign was Captain DMITRI PAULUTSKI. Under his command a new campaign was undertaken against the Chukches. With a force of 215 Russians, 160 Cossacks and 60 Yukagires, Paulutski left Anadyrsk on the $\frac{23\text{rd}}{12\text{th}}$ March, 1731, and marched east of the sources of the Anadyr to the Polar Sea, which was only reached after two months' march. Then he went along the coast, partly by land, partly on the ice, to the eastward. After fourteen days he fell in with a large Chukch army, and having in vain summoned it to surrender, he delivered a blow on the $\frac{18}{7}$th June, and obtained a complete victory over the enemy. During the continuation of the campaign along the coast he was compelled to fight on two other occasions, one on the $\frac{11\text{th July}}{30\text{th June}}$ and the other on the $\frac{25}{14}$th July, at Chukotskojnos itself, over which promontory he wished to march to the mouth of the Anadyr. In both cases the victory lay with the Russians, who, according to Müller's account based on the official documents, in all three engagements lost only three Cossacks, one Yukagire and five Koryäks. But notwithstanding all these defeats the Chukches refused to submit and pay tribute to the Russians, on which account the only gain of the campaign was the honour of avenging Schestakov's defeat and of marching in triumph over Chukotskojnos. For this, ten days were required. On the promontory, hills of considerable height had to be passed. It appears as if Paulutski followed the shore of Kolyutschin Bay to the south, and then marched over the tongue of land which separates this bay from Anadyr Bay,

or to express it otherwise, which unites the Chukch peninsula to the mainland of Siberia.

Many mistakes in comprehending the accounts of old travels to these regions have arisen from our ignorance of the great southern extension of Kolyutschin Bay, and from the same name being frequently used to distinguish different places on the coasts of Siberia. Thus we find on the map by A. ARROWSMITH annexed to Sauer's account of Billings' travels a Serdze Kamen on the south side of Chukch peninsula, and it was perhaps just this Serdze Kamen, known and so named by the dwellers on the Anadyr, that is mentioned in Müller's account of Paulutski's campaign.

On the $\frac{1st\ Nov.}{21st\ Oct.}$ Paulutski returned to Anadyrsk, crowned with victory indeed, but without having brought his adversaries t lasting submission. No new attempt was made to induce th Chukches to submit, perhaps because Paulutski's campaign ha rendered it evident that it was easier to win victories over th Chukches than to subdue them, and that the whole treasures walrus tusks and skins belonging to the tribe would scarcel suffice to pay the expenses of the most inconsiderab campaign.

Perhaps too the accounts of Paulutski's victories may n be quite correct, at least the old repute of Chukches a brave and savage race remained undiminished. Thus read in a note already quoted at page 110 of the *Histo généalogique des Tartares*:[1] "The north-eastern part of Asia inhabited by two allied races, *Tzuktzchi* and *Tzchalatzki*, s south of them on the Eastern Ocean by a third, called *Olutor* They are the most savage tribe in the whole north of Asia, a

[1] The work is a translation made at Tobolsk by Swedish offic prisoners of war from the battle of Pultava, from a Tartar manuscrip Abulgasi Bayadur Chan. The original manuscript (?) is in the librar Upsala, to which it was presented in 1722 by Lieutenant-Colonel Sc ström. The translation has notes by Bentinck, a Dutchman by birth, was also taken prisoner in the Swedish service at Pultava.

will have nothing to do with the Russians, whom they inhumanly kill when they fall in with them, and when any of them fail into the hands of the Russians they kill themselves." On the map of LOTTERUS (1765) the Chukch Peninsula is coloured in a way differing from Russian Siberia; and there is the [illegible] inscription: *Tjuktzchi natio ferocissima et [illegible] inimica, qui capti se invicem interficiunt.* In 1777 [illegible] says in his *Beschreibung aller [illegible]* (part ii., p. 350) of the Chukches: "They are [illegible] coarse, proud, refractory, thievish, false and [illegible] the neighbouring nomads the Koryaks. They are [illegible] dangerous as the Tunguses are [illegible]. [illegible] beat fifty Koryaks. The [illegible] neighbourhood of their country are [illegible] them, and cost so [illegible] withdrawn the [illegible] Anadyrsk." Other [illegible] noted, and even [illegible] justification [illegible] love of freedom.

But [illegible]

[illegible]

Among former travellers on the Chukch peninsula, who visited the encampments of the coast Chukches, besides Behring, Cook, and other seafarers, the following may be mentioned:—

The Cossack, PETER ILIIN SIN POPOV, was sent in 1711 with two interpreters to examine the country of the Chukches, and has left some interesting accounts of his observations there (MÜLLER, *Sammlung Russischer Geschichten*, iii. p. 56).[1]

BILLINGS, with his companions SAUER, SARYTSCHEV, &c., visited Chukch-land in 1791. Among other things, accompanied by Dr. MERK, two interpreters and eight men, he made a journey from Metschigme Bay over the interior of Chukch-land to Yakutsk. Unfortunately the account we have of this remarkable journey is exceedingly incomplete.[2]

FERDINAND VON WRANGEL during his famous Siberian travels was much in contact with the Chukches, and among his other journeys travelled in the winter of 1823 in dog sledges along the coast of the Polar Sea from the Kolyma to Kolyutschin Island (Wrangel, *Reise*, ii. pp. 176-231). There are besides many notices of the Chukches at other places in the same work (i. pp. 267-293; ii. pp. 156, 168, &c.).

FRIEDRICH VON LÜTKE in the course of his circumnavigation of the globe in 1826-29, came in contact with the population of the Chukch peninsula, whom he described in detail in Erman's *Archiv* (iii. pp. 446-464). Here it ought to be noted that, while the population on the North coast consists of true Chukches, the coast population of the region which Lütke visited,

[1] Müller has likewise saved from oblivion some other accounts regarding the Chukches, collected soon after at Anadyrsk. When we now read these accounts, we find not only that the Chukches knew the Eskimo on the American side, but also stories regarding the Indians of Western America penetrated to them, and further, through the authorities in Siberia, came to Europe, a circumstance which deserves to be kept in mind in judging of the writings of Herodotus and Marco Polo.

[2] Sauer, *An Account*, &c., pp. 255 and 319. Sarytschev, *Reise, übersetzt von Busse*, ii. p. 102.

the stretch between the Anadyr and Cape Deschnev consists of a tribe, *Namollo*, which differs from the Chukches, and is nearly allied to the Eskimo on the American side of Behring's Straits.

The English Franklin Expedition in the *Plover*, commanded by Captain MOORE, wintered in 1848-49 at Chukotskojnos, and, both at the winter station and in the course of extensive excursions with dogs along the coast and to the interior of the country, came much into contact with the natives. The observations made during the wintering were published in a work of great importance for a knowledge of the tribes in question by Lieutenant W. H. HOOPER, *Ten Months among the Tents of the Tuski*, London, 1853.

C. VON DITTMAR[1] travelled in 1853 in the north part of Kamchatka, and there came in contact with the reindeer nomads, especially with the Koryäks. The information he gives us about the Chukches (p. 126) he had obtained from the Nischni-Kolymsk merchant, TRIFONOV, who had traded with them for twenty-eight years, and had repeatedly travelled in the interior of the country.

Interesting contributions to a knowledge of the mode of living of the reindeer-Chukches were also collected by Baron G. VON MAYDELL, who, in 1868 and 1869, along with Dr. CARL VON NEUMANN and others, made a journey from Yakutsk by Sredni-Kolymsk and Anjui to Kolyutschin Bay. Unfortunately, with regard to this expedition, I have only had access to some notices in the *Proceedings of the Royal Geographical Society* (vol. 21, London 1877, p. 213), and *Das Ausland* (1880, p. 861). The proper sketch of the journey is to be found in *Isvestija*, published by the Siberian division of the Russian Geographical Society, parts 1 and 2.

[1] *Über die Koriäken und die ihnen sehr nahe verwandten Tschuktschen* (Bulletin historico-philologique de l'Académie de St. Pétersbourg, t. xiii., 1856, p. 126.)

With reference to the other travellers whose writings are usually quoted as sources for a knowledge of the Chukches, it may be mentioned that STELLER and KRASCHENINNIKOV only touch in passing on the true Chukches, but instead give very instructive and detailed accounts of the Koryāks, who are as nearly allied to the Chukches as the Spaniards to the Portuguese, but yet differ considerably in their mode of life; also that a part of these authors' statements regarding the Chukches do not at all refer to that tribe, but to the Eskimo. It appears indeed that recently, after the former national emnity had ceased, mixed races have arisen among these tribes. But it ought not to be forgotten that they differ widely in origin, although the Chukches as coming at a later date to the coast of the Polar Sea have adopted almost completely the hunting implements and household furniture of the Eskimo; and the Eskimo again, in the districts where they come in contact with the Chukches, have adopted various things from their language.

Like the Lapps and most other European and Asiatic Polar races, the Chukches fall into two divisions speaking the same language and belonging to the same race, but differing considerably in their mode of life. One division consists of reindeer nomads, who, with their often very numerous reindeer herds, wander about between Behring's Straits, and the Indigirka and the Penschina Bays. They live by tending reindeer and by trade, and consider themselves the chief part of the Chukch tribe. The other division of the race are the coast Chukches, who do not own any reindeer, but live in fixed but easily moveable and frequently moved tents along the coast between Chaun Bay and Behring's Straits. But beyond East Cape there is found along the coast of Behring's Sea another tribe, nearly allied to the Eskimo. This is Wrangel's *Onkilon*, Lütke's *Namollo*. Now, however, Chukches also have settled at several points on this line of coast, and a portion of the Eskimo have adopted the language of the superior Chukch race. Thus the

inhabitants at St. Lawrence Bay spoke Chukch, with little mixture of foreign words, and differed in their mode of life and appearance only inconsiderably from the Chukches, whom during the course of the winter we learned to know from nearly all parts of the Chukch peninsula. The same was the case with the natives who came on board the *Vega* while we sailed past East Cape, and with the two families we visited in Konyam Bay. But the natives in the north-west part of St. Lawrence Island talked an Eskimo dialect, quite different from Chukch. There were, however, many Chukch words incorporated with it. At Port Clarence on the contrary there lived pure Eskimo. Among them we found a Chukch woman who informed us that there were Chukch villages also on the American side of Behring's Strait, north of Prince of Wales Cape. These cannot, however, be very numerous or populous, as they are not mentioned in the accounts of the various English expeditions to those regions; they are not noticed for instance in Dr. JOHN SIMPSON'S instructive memoir on the Eskimo at Behring's Straits.

We were unable during the voyage of the *Vega* to obtain any data for estimating the number of the reindeer-Chukches. But the number of the coast Chukches may be arrived at in the following way. Lieutenant Nordquist collected from the numerous foremen who rested at the *Vega* information as to the names of the encampments which are to be found at present on the coast between Chaun Bay and Behring's Straits, and the number of tents at each village. He thus ascertained that the number of the tents in the coast villages amounts to about 400. The number of inhabitants in every tent may be, according to our experience, averaged at five. The population on the line of coast in question may thus amount to about 2,000, at most to 2,500, men, women, and children. The number of the reindeer-Chukches appears to be about the same. The whole population of Chukch Land may thus now amount to 4,000 or 5,000 persons. The Cossack Popov already mentioned, reckoned in 1711 that all the

Chukches, both reindeer-owning and those with fixed dwellings, numbered 2,000 persons. Thus during the last two centuries, if these estimates are correct, this Polar race has doubled its numbers.

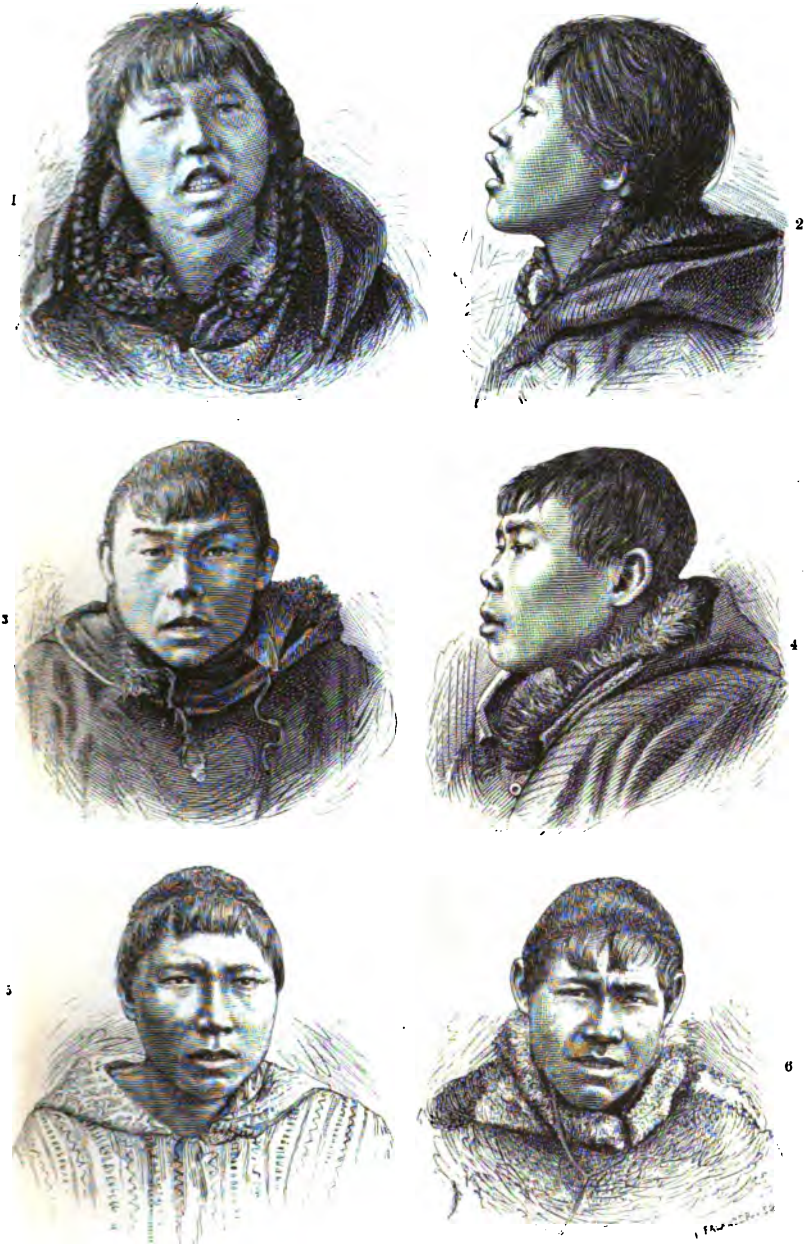
In order to give the reader an idea of the language of the Chukches, I have in a preceding chapter given an extract from the large vocabulary which Nordquist has collected. There appear to be no dialects differing very much from each other. Whether foreign words borrowed from other Asiatic languages have been adopted in Chukch we have not been able to make out. It is certain that no Russian words are used. The language strikes me as articulate and euphonious. It is nearly allied to the Koryäk, but so different from other, both East-Asiatic and American, tongues, that philologists have not yet succeeded in clearing up the relationship of the Chukches to other races.

Like most other Polar tribes, the Chukches now do not belong to any unmixed race. This one is soon convinced of, if he considers attentively the inhabitants of a large tent-village. Some are tall, with tallowlike, raven-black hair, brown complexion, high aquiline nose—in short, with an exterior that reminds us of the descriptions we read of the North American Indians. Others again by their dark hair, slight beard, sunk nose or rather projecting cheek-bones and oblique eyes, remind us distinctly of the Mongolian race; and finally we meet among them with very fair faces, with features and complexion which lead us to suspect that they are descendants of runaways or prisoners of war of purely Russian origin. The most common type is—straight, coarse, black hair of moderate length; the brow tapering upwards; the nose finely formed, but with its root often flattened: eyes by no means small; well-developed black eyebrows; projecting cheeks often swollen by frostbite, which is specially observable when the face is looked at from the side; light, slightly brown complexion, which in the young women is often nearly as red and white as in Europeans. The beard is

TYPICAL CHUKCH FACES.

1. Manschetsko, a man from Pitlekaj. 2. Young man from Irgunnuk. 3. Chajdodlin, a man from Irgunnuk. 4. Reindeer-Chukch. 5. Old man from Irgunnuk. 6. Man from Yinretlen.

(After photographs by L. Palander.)



TYPICAL CHUKCH FACES.

1, 2. Nautsing, a woman from Pitlekaj. 3, 4. Rotschitlen. 5. Young man from Vankarema. 6. Young man from Irgunnuk.

(After photographs by L. Palander.)

always scanty. Nearly all are stout and well grown; we saw no cripples among them. The young women often strike one as very pretty if one can rid oneself of the unpleasant impression of the dirt, which is never washed away but by the drifting snow of winter, and of the nauseous train-oil odour which in winter they carry with them from the close tent-chamber. The children nearly always make a pleasant impression by their healthy appearance, and their friendly and becoming behaviour.

The Chukches are a hardy race, but exceedingly indolent when want of food does not force them to exertion. The men during their hunting excursions pass whole days in a cold of $-30°$ to $-40°$ out upon the ice, without protection and without carrying with them food or fuel. In such cases they slake their thirst with snow, and assuage their hunger, if they have been successful in hunting, with the blood and flesh of the animals they have killed. Women nearly naked often during severe cold leave for a while the inner tent, or tent-chamber, where the train-oil lamp maintains a heat that is at times oppressive. A foreigner's visit induces the completely naked children to half creep out from under the curtain of reindeer skin which separates the sleeping chamber from the exterior tent, in which, as it is not heated, the temperature is generally little higher than that of the air outside. In this temperature the mothers do not hesitate to show their naked children, one or two years of age, to visitors for some moments.

Diseases are notwithstanding uncommon, with the exception that in autumn, before the severe cold commences, nearly all suffer from a cough and cold. Very bad skin eruptions and sores also occur so frequently that a stay in the inner tent is thereby commonly rendered disgusting to Europeans. Some of the sores however are merely frostbites, which most Chukches bring on themselves by the carelessness with which during high winds they expose the bare neck, breast, and wrists to the lowest temperature. When frostbite has happened it is

treated, even though of considerable extent, with extreme carelessness. They endeavour merely to thaw the frozen place as fast as possible partly by chafing, partly by heating. On the other hand we never saw any one who had had a deep frostbite on the hands or feet, a circumstance which must be ascribed to the serviceable nature of their shoes and gloves. From the beginning of October 1878 to the middle of July 1879 no death appears to have happened at any of the encampments near us. During the same time the number of the inhabitants was increased by two or three births. During the wife's pregnancy the husband was very affectionate to her, gave her his constant company in the tent, kissed and fondled her frequently in the presence of strangers, and appeared to take a pride in showing her to visitors.

We had no opportunity of witnessing any burial or marriage. It appears as if the Chukches sometimes burn their dead, sometimes expose them on the *tundra* as food for beasts of prey, with weapons, sledges, and household articles. They have perhaps begun to abandon the old custom of burning the dead, since the hunting has fallen off so that the supply of blubber for burning has diminished. I have before described the pits filled with burned bones which Dr. Stuxberg found on the 9th September, 1878, by the bank of a dried-up rivulet. We took them for graves, but not having seen any more at our winter station, we began to entertain doubts as to the correctness of our observation.[1] It is at least certain that the inhabitants of Pitlekaj exclusively bury their dead by laying them out on the *tundra*.

[1] That the Chukches burn their dead with various ceremonies is stated by Sarytschev on the ground of communications by the interpreter Daurkin, who lived among the reindeer-Chukches from 1787 to 1791, in order to learn their language and customs, and to announce the arrival of Billings' expedition (Sarytschev's *Reise*, ii. p. 108). The statement is thus certainly quite trustworthy. The coast population with whom Hooper came in contact, on the other hand, laid out their dead on special stages, where the corpses were allowed to be eaten up by ravens or to decay (*loc. cit.* p. 88).

Regarding the man, buried or exposed in this way, whom Johnsen found on the 15th October, Dr. Almquist, who himself visited the place the next day, makes the following statement:—

"The place was situated five to seven kilometres from the village Yinretlen, near the bottom of the little valley which runs from this village in a southerly direction into the interior. The body was exposed on a little low knoll only two fathoms across. It was covered with loose snow, and was not frozen very hard. When it was loosened there was no proper pit to be seen in the underlying snow and ice. The corpse lay from true N.N.W. to S.S.E., with the head to the former quarter. Under the head lay two black rounded stones, such as the Chukches use in housekeeping. Besides these there was no trace of anything underlying or covering the corpse. The clothes had been torn by beasts of prey from the body; the back was quite untouched,

PLAN OF A CHUKCH GRAVE.
(After a drawing by A. Stuxberg.)

but the face and breast were much wasted, and the arms and legs almost wholly eaten up. On the knoll evident traces of the wolf, the fox, and the raven were visible. Close to the right side of the corpse had lain the weapons which Johnsen had brought home the day before. Near the feet was found a sledge completely broken in pieces, evidently new and smashed on the spot. Not far off, we found lying on the snow pieces of a *pesk* and of foot-coverings, both new and of the finest quality. Beasts of prey had undoubtedly torn them off and pulled them about. On the knoll there were found besides five or six other graves, distinguished by small stones or a wooden block lying on the even ground. Two of the graves were ornamented by a collection of reindeer horns. The severe cold prevented me from ascertaining whether these stones concealed the remains of buried corpses. I considered that I might take the Chukch's head, as otherwise the wolves would doubtless have eaten it up. It was taken on board and skeletonised."

In the spring of 1879, after the snow was melted, we had further opportunities of seeing a large number of burying-places, or more correctly of places where dead Chukches had been laid out. They were marked by stones placed in a peculiar way, and were measured and examined in detail by Dr. Stuxberg, who gives the following description of them :—

"The Chukch graves on the heights south of Pitlekaj and Yinretlen, which were examined by me on the 4th and 7th July, 1879, were nearly fifty in number. Every grave consisted of an oval formed of large lying stones. At one end there was

TENT FRAME AT PITLEKAJ.
(After a drawing by G. Bove.)

generally a large stone raised on its edge, and from the opposite end there went out one or two pieces of wood lying on the ground. The area within the stone circle was sometimes overlaid with small stones, sometimes free and overgrown with grass. At all the graves, at a distance of four to seven paces from the stone standing on its edge in the longitudinal axis of the grave or a little to the side of it, there was another smaller circle of stones inclosing a heap of reindeer horns, commonly containing also broken seals' skulls and other fragments of bones. Only in one grave were found pieces of human bones. The graves were evidently very old, for the bits of wood at the ends were generally much decayed and almost wholly covered with earth,

and the stones were completely overgrown with lichens on the upper side. I estimate the age of these graves at about two hundred years."

The Chukches do not dwell in snow huts, nor in wooden houses, because wood for building is not to be found in the country of the coast Chukches, and because wooden houses are unsuitable for the reindeer nomad. They live summer and winter in tents of a peculiar construction, not used by any other race. For in order to afford protection from the cold the tent is double; the outer envelope inclosing an inner tent or sleeping chamber. This has the form of a parallelopiped, about 3·5 metres long, 2·2 metres broad, and 1·8 metre high. It is surrounded by thick, warm, reindeer skins, and is further covered with a layer of grass. The floor consists of a walrus skin stretched over a foundation of twigs and straw. At night the floor is covered with a carpet of reindeer skins, which is taken away during the day. The rooms at the sides of the inner tent are also shut off by curtains, and serve as pantries. The inner tent is warmed by three train-oil lamps, which together with the heat given off by the numerous human beings packed together in the tent, raise the temperature to such a height that the inhabitants even during the severest winter cold may be completely naked. The work of the women and the cooking are carried on in winter in this tent-chamber, very often also the calls of nature are obeyed in it. All this conduces to make the atmosphere prevailing there unendurable. There are also, however, cleanlier families, in whose sleeping chamber the air is not so disgusting.

In summer they live during the day, and cook and work, in the outer tent. This consists of seal and walrus skins sewed together, which however are generally so old, hairless, and full of holes, that they appear to have been used by several generations. The skins of the outer tent are stretched over wooden ribs, which are carefully bound together by thongs of skin. The ribs rest partly on posts, partly on tripods of driftwood.

The posts are driven into the ground, and the tripods get the necessary steadiness by a heavy stone or a seal-skin sack filled with sand being suspended from the middle of them. In order further to steady the tent a yet heavier stone is in the same way suspended by a strap from the top of the tent-roof, or the summit of the roof is made fast to the ground by thick thongs. At one place a tackle from a wrecked vessel was used for this purpose, being tightened with a block between the top of the roof and an iron hook frozen into the ground. The ribs in every tent are besides supported by T-formed cross stays.

The entrance consists of a low door, which, when necessary, may be closed with a reindeer skin. The floor of the outer tent consists of the bare ground. This is kept very clean, and the few household articles are hung up carefully and in an orderly manner along the walls on the inner and outer sides of the tent. Near the tent are some posts, as high as a man, driven into the ground, with cross pieces on which skin boats, oars, javelins, &c., are laid, and from which fishing and seal nets are suspended.

In the neighbourhood of the dwellings the storehouse is placed. It consists of a cellar excavated at some suitable place. The sites of old Onkilon dwellings are often used for this purpose. The descent is commonly covered with pieces of driftwood which are loaded with stones; at one place the door, or rather the hatch, of the cellar consisted of a whale's shoulder-blade. In consequence of the unlimited confidence which otherwise was wont to prevail between the natives and us, we were surprised to find them unwilling to give the *Vega* men admittance to their storehouses. Possibly the report of our excavations for old implements at the sites of Onkilon dwellings at Irkaipij had spread to Kolyutschin, and been interpreted as attempts at plunder.

The tents were always situated on the sea shore, generally on the small neck of land which separates the strand lagoons from

the sea. They are erected and taken down in a few hours. A Chukch family can therefore easily change its place of residence, and does remove very often from one village to another. Sometimes it appears to own the wooden frame of a tent at several places, and in such cases at removal there are taken along only the tent covering, the dogs, and the most necessary skin and household articles. The others are left without inclosure, lock, or watch, at the former dwelling-place, and one is certain to find all untouched on his return. During short stays at a place there are used, even when the temperature of the air is considerably under the freezing-point, exceedingly defective tents or huts made with the skin boats that may happen to be available. Thus a young couple who returned in spring to Pitlekaj lived happy and content in a single thin and ragged tent or conical skin hut which below where it was broadest was only two and a half metres across. An accurate inventory, which I took during the absence of the newly married pair, showed that their whole household furniture consisted of a bad lamp, a good American axe, some reindeer skins, a small piece of mirror, a great many empty preserve tins from the *Vega*, which among other things were used for cooking, a fire-drill, a comb, leather for a pair of moccassins, some sewing implements, and some very incomplete and defective tools.

CHUKCH OAR.
One-sixteenth of the natural size.

The boats are made of walrus skin, sewed together and stretched over a light frame-work of wood and pieces of bone. The different parts of the frame-work are bound together with thongs of skin or strings of whalebone. In form and size the Chukches' large boat, *atkuat*, called by the Russians *baydar*,

corresponds completely with the Greenlander's *umiak* or woman's boat. It is so light that four men can take it upon their shoulders, and yet so roomy that thirty men can be conveyed in it. One seldom sees *anatkuat*, or boats intended for only one man; they are much worse built and uglier than the Greenlander's *kayak*. The large boats are rowed with broad-bladed oars, of which every man or woman manages only one. By means of these oars a sufficient number of rowers can for a little raise the speed of the boat to ten kilometres per hour. Like the Greenlanders, however, they often cease rowing in order to rest, laugh, and chatter, then row furiously for some minutes rest themselves again, row rapidly, and so on. When the sea is covered with thin newly formed ice they put two men in the fore of the boat with one leg over in order to trample the ice in pieces.

During winter the boats are laid up, and instead the dog-sledges are put in order. These are of a different construction from the Greenland sledges, commonly very light and narrow, made of some flexible kind of wood, and shod with plates of whales' jawbones, whales' ribs, or whalebone. In order to improve the running, the runners before the start are carefully covered with a layer of ice from two or three millimetres in thickness by repeatedly pouring water over them.[1] The different parts of the sledge are not fastened together by nails, but are bound together by strips of skin or strings of whalebone. On the low uncomfortable seat there commonly lies a piece of skin, generally of the Polar bear. The number of dogs that are harnessed to each sledge is variable. I have seen a Chukch riding behind two small lean dogs, who however appeared to draw their heavy load over even hard snow without any extraordinary exertion. At other sledges I have seen ten or twelve

[1] If the runners are not shod with ice in this way the friction between them and the hard snow is very great during severe cold, and the draught accordingly exceedingly heavy.

masters. A piece of a whale, with the skin and part of the flesh adhering, washed out of frozen sandy strata thus lay untouched some thousand paces from Pitlekaj; and the neighbourhood of the tents, where the hungry dogs were constantly wandering about, formed, as has been already stated, a favourite haunt for ptarmigan and hares during winter. Young dogs some months old are already harnessed along with the team in order that they may in time become accustomed to the draught tackle. During the cold season the dogs are permitted to live in the outer tent, the females with their young even in the inner. We had two Scotch collies with us on the *Vega*. They at first frightened the natives very much with their bark. To the dogs of Chukches they soon took the same superior standing as the European claims for himself in relation to the savage. The dog was distinctly preferred by the female Chukch canine population, and that too without the fights to which such favour on the part of the fair commonly gives rise. A numerous canine progeny of mixed Scotch-Chukch breed has thus arisen at Pitlekaj. The young dogs had a complete resemblance to their father, and the natives were quite charmed with them.

W' dog is to be killed the Chukch stabs it with his spear, and then lets it bleed to death. Even when the scarcity was so great that the natives at Pitlekaj and Yinretlen lived mainly on the food we gave them, they did not eat the dogs they killed. On the other hand they had no objection to eating a shot crow.

When the Chukch goes out on the ice to hunt seals he takes his dogs with him, and it is these which take home the catch, commonly with the draught-line fastened directly to the head of the killed seal, which is then turned on its back and dragged over the ice without anything under it. One of the inhabitants of Yinretlen returned from the open water off the coast after a successful hunting expedition with five seals, of which

the smallest was laid on the sledge, the others being fastened one behind the other in a long row. After the last was drawn a long pole, which was used in setting the net.

The dress of the Chukches is made of reindeer or seal-skin. The former, because it is warmer, is preferred as material for the winter dress. The men in winter are clad in two *pesks*; that which is worn next the body is of thin skin with the hair inwards, the outer is of thick skin with the hair outwards. Besides, they wear, when it rains or wet snow falls, a great coat of gut or of cotton cloth, which they call *calico*. On one occasion I saw such an overcoat made of a kind of reindeer-chamois leather, which was of excellent quality and evidently of home manufacture. It had been originally white, but was ornamented with broad brown painted borders. Some red and blue woollen shirts which we gave them were also worn above the skin clothes, and by their showy colours awakened great satisfaction in the owners. The Chukch *pesk* is shorter than the Lapp one. It does not reach quite to the knees, and is confined at the waist with a belt. Under the *pesk* are worn two pairs of trousers, the inner pair with the hair inwards, and the outer with the hair outwards. The trousers are well made, close fitting, and terminate above the foot. The foot-covering consists of reindeer or seal-skin moccassins, which above the foot are fastened to the trousers in the way common among the Lapps. The soles are of walrus-skin or bear-skin, and have the hair side inwards. On the other parts of the moccassin the hair is outwards. Within the shoes are seal-skin stockings and hay. The head covering consists of a hood embroidered with beads, over which in severe cold is drawn an outer hood bordered with dog-skin. The outer hood is often quite close under the chin, and extends in a very well-fitting way over the shoulders. To a complete dress there also belong a skin neckerchief or boa, and a neck covering of multiple reindeer-skins, or of different kinds of skins sewn together in chess-board-like squares. In summer and far into

the autumn the men go bareheaded, although they clip the hair on the crown of the head close to the root.

During the warm season of the year a number of the winter wraps are laid off in proportion to the increase of the heat, so that the dress finally consists merely of a *pesk*, an overcoat, and a pair of trousers. The summer moccassins are often as long in the leg as our sea-boots. In the tent the men wear only short trousers reaching to the hip, together with leather belts (health-belts) at the waist and on the arms. The man's dress is not much ornamented. On the other hand the men often wear strings of beads in the ears, or a skin band set with large, tastefully arranged beads or a leather band with some large beads on the brow. The leather band they will not willingly part with, and a woman told us that the beads in it indicate the number of enemies the wearer has killed. I am, however, quite certain that this was only an empty boast. Probably our informant referred to a tradition handed down from former warlike periods to the present time, and thus we have here only a Chukch form of the boasting about martial feats common even among civilised nations.

To the dress of the men there belongs further a screen for the eyes, which is often beautifully ornamented with beads and silver mounting. This screen is worn especially in spring as a protection from the strong sunlight reflected from the snow-plains. At this season of the year snow-blindness is very common, but notwithstanding this snow-spectacles of the kind which the Eskimo and even the Samoyeds use are unknown here.

The men are not tattooed, but have sometimes a black or red cross painted on the cheek. They wear the hair cut close to the root, with the exception of a short tuft right on the crown of the head and a short fringe above the brow. The women have long hair, parted right in the middle, and plaited along with strings of beads into plaits which hang down by the

ears. They are generally tattooed on the face, sometimes also on the arms or other parts of the body. The tattooing is done by degrees; possibly certain lines are first made at marriage.

The dress of the women, like that of the men, is double during winter. The outer *pesk*, which is longer and wider than the man's, passes downwards into a sort of very wide trousers. The sleeves too are exceedingly wide, so that the arm may easily be drawn in and stuck out. Under the outer *pesk* there is an

CHU'KCH FACE-TATTOOING.
(After a drawing by A. Stuxberg.)

inner *pesk*, or skin-shirt, and under them a pair of very short trousers is worn. Where the outer *pesk* ends the moccassins begin. At the neck the *pesk* is much cut away, so that a part of the back is bare. I have seen girls go with the upper part of the back exposed in this way even in a cold of $-30°$ or $-40°$. The stockings have the hair inwards, they are bordered with dog-skin, and go to the knees. The moccassins, chin-covers, hoods, and neckerchiefs differ little from the corresponding

articles of men's dress. The woman's dress is in general more ornamented than the man's, and the skins used for it appear to be more carefully chosen and prepared. In the inner tent the women go nearly naked, only with quite short under-trousers of skin or *calico* or a narrow *cingulum pudicitiæ*. On the naked body there are worn besides one or two leather bands on one arm, a leather band on the throat, another round the waist, and

a b

CHUKCH CHILDREN.

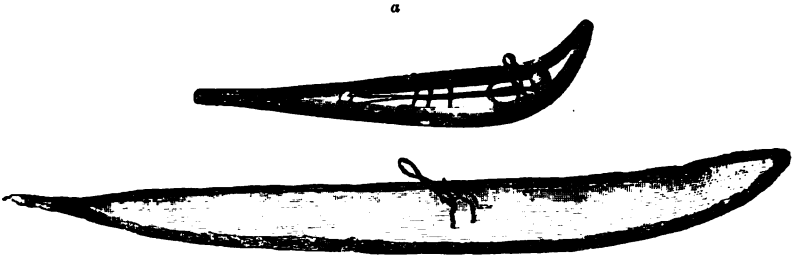
a. Girl from Irgunnuk. (After a photograph by L. Palander.) b. Boy from Pitlekaj, with his mother's hood on. (After a drawing by the seaman Hansson.)

some bracelets of iron or less frequently of copper on the wrists. The younger women however do not like to show themselves in this dress to foreigners, and they therefore hasten at their entrance to cover the lower part of the body with the *pesk*, or some other piece of dress that may be at hand.

When the children are some years old they get the same dress as their parents, different for boys and girls. While small

they are put into a wide skin covering with the legs and arms sewed together downwards. Behind there is a four-cornered opening through which moss (the white, dead part of Sphagnum), intended to absorb the excreta, is put in and changed. At the ends of the arms two loops are fastened, through which the child's legs are passed when the mother wishes to put it away in some corner of the tent. The dress itself appears not to be changed until it has become too small. In the inner tent the children go completely naked.

Both men and women use snow-shoes during winter. Without them they will not willingly undertake any long walk in



SNOW-SHOES.

a. The common kind. *b*. Intended to be used in the way shown in the drawing on the opposite page.

(One-thirteenth of the natural size.)

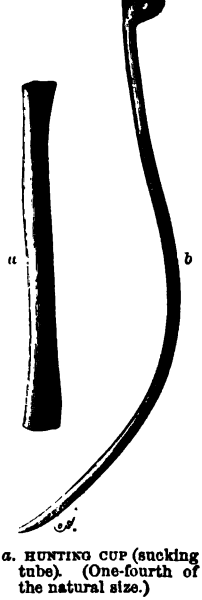
loose snow. They consider such a walk so tiresome, that they loudly commiserated one of my crew, who had to walk without snow-shoes after drifting weather from the village Yinretlen to the vessel, about three kilometres distant. Finally a woman's compassion went so far that she presented him with a pair; an instance of generosity on the part of our Chukch friends which otherwise was exceedingly rare. The frame of the snow-shoes is made of wood, the cross-pieces are of strong and well-stretched thongs. This snow-shoe corresponds completely with that of the Indians, and is exceedingly serviceable and easy to get

accustomed to. Another implement for travelling over snow was offered by a Chukch who drove past the vessel in the beginning of February. It consisted of a pair of immensely wide skates of thin wood, covered with seal-skin, and raised at both sides. I had difficulty in understanding how these broad shapeless articles could be used with advantage until I learned from the accompanying drawing that they may be employed as a sort of sledges. The drawing is taken from a Japanese work, whose title when translated runs thus: A Journey to the north part of Japan (Yezo), 1804 (No 565 of the Japanese library I brought home with me).

AN AINO MAN SKATING AFTER A REINDEER.
(Japanese drawing.)

In consequence of the difficulty which the Chukch has during winter in procuring water by melting snow over the train-oil lamp, there can be no washing of the body at that season of the year. Faces are however whipped clean by the drifting snow, but at the same time are generally swollen or sore from frost-bite. On the whole, the disposition of the Chukches to cleanliness is slight, and above all, their ideas of what is clean or unclean differs considerably from ours. Thus the women use urine as a wash for the face. At a common meal the hand is

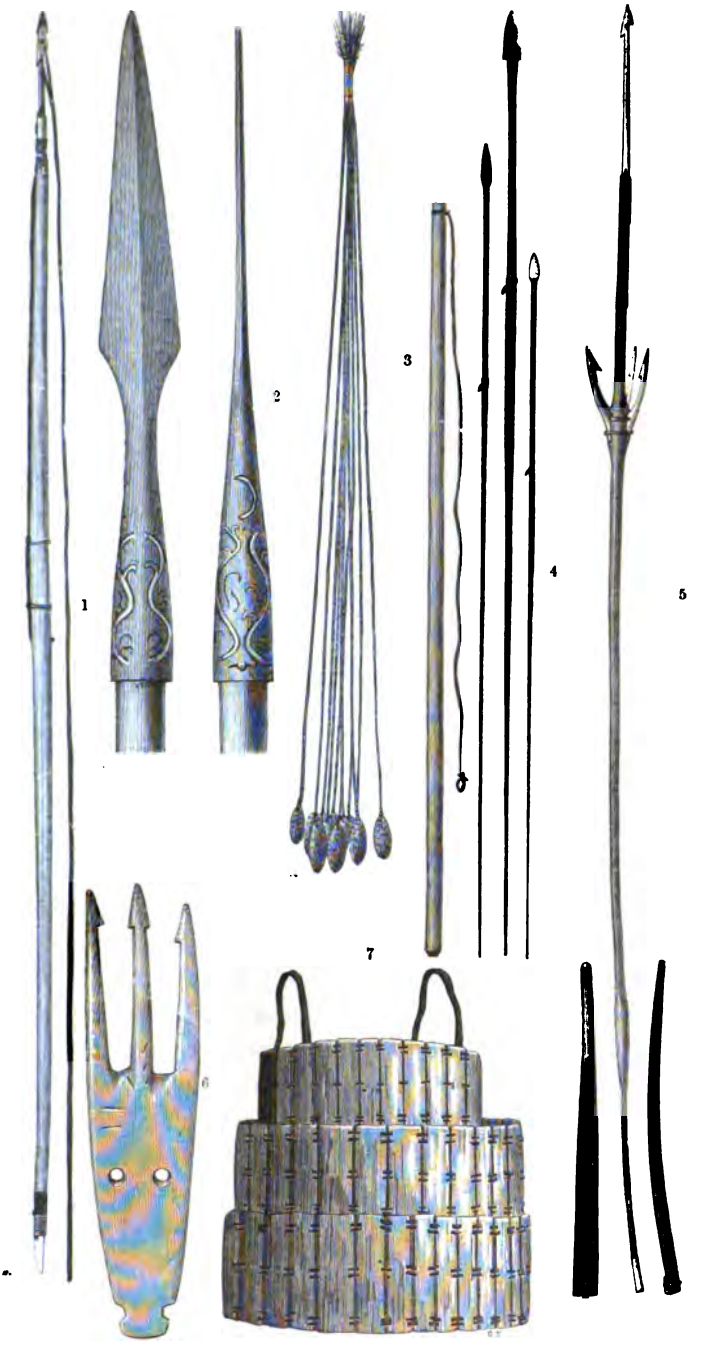
often used as a spoon, and after it is finished, a bowl filled with newly-passed urine instead of water is handed round the company for washing the hands. Change of clothes takes place seldom, and even when the outer dress is clean, new and well cut, of carefully-chosen beautiful skins, the under-dress is very dirty, and vermin numerous enough, though less so than might have been expected. Food is often eaten in a way which we consider disgusting, a titbit, for instance, is passed from mouth to mouth. The vessels in which food is served are used in many ways and seldom cleaned. On the other hand it may be stated that, in order not to make a stay in the confined tent-chamber too uncomfortable, certain rules are strictly observed. Thus, for instance, it is not permitted in the interior of the tent to spit on the floor, but this must be done into a vessel which in case of necessity is used as a night-utensil. In every outer tent there lies a specially carved reindeer horn, with which snow is removed from the clothes; the outer *pesk* is usually put off before one goes into the inner tent and the shoes are carefully freed from snow. The carpet of walrus-skin, which covers the floor of the inner tent, is accordingly dry and clean. Even the outer tent is swept clean and free from loose snow, and the snow is daily shovelled away from the tent doors with a spade of whalebone. Every article both in the outer and inner tent is laid in its proper place, and so on.



a. HUNTING CUP (sucking tube). (One-fourth of the natural size.)

b. SNOW-SCRAPER. (One-eighth of the natural size.)

As ornaments glass beads are principally used, some of them being suspended from the neck and ears, others sewed upon the hood and other articles of dress, or plaited into the hair.



CHUKCH WEAPONS AND HUNTING IMPLEMENTS.

1. Harpoon (one-fifteenth of the natural size). 2. Spear found at a grave (one-fourth). 3. Bird sling (one-eighth). 4. Darts with whip-sling for casting them (one-seventh). 5. Bird-Dart with wooden handle for throwing (one-twelfth). 6. Leister of bone (one-fourth). 7. Ivory coat of mail (one-ninth).

CHUKCH BOW AND QUIVER.
(One-eighth of the natural size.)

Embroidery of very pleasing patterns is also employed. In order to embellish the *pesks* strips of skin or marmots' and squirrels' tails, &c., are sewed upon them. Often a variegated artificial tail of different skins is fixed to the hood behind, or the skin of the hood is so chosen that the ears of the animal project on both sides of the head. Along with the beads are fixed amulets, wooden tongs, small bone heads or bone figures, pieces of metal, coins, &c. One child had suspended from its neck an old Chinese coin with a square hole in the middle, together with a new American five-cent piece.

In former times beautiful and good weapons were probably highly prized by so warlike a people as the Chukches, but now weapons are properly scarce antiquities, which, however, are still regarded with a certain respect, and therefore are not readily parted with. The lance which was found beside the corpse (fig. 2 on p. 105) shows by its still partially preserved gold decorations that it had been forged by the hand of an artist.

Probably it has formed part of the booty won long ago in the fights with the Cossacks. I procured by barter an ivory coat of mail (fig. 7 on p. 105), and remains of another. The ivory plates of the coat of mail are twelve centimetres in length, four in breadth, and nearly one in thickness, holes being bored at

CHUKCH ARROWS.

(One-ninth of the natural size.) *a*. An arrowhead (one-half the natural size).

their edges for the leather thongs by which the plates are bound together. This binding has been so arranged that the whole coat of mail, when not in use, may be rolled together.

Along with the spear and the coat of mail the old Chukches used the bow for martial purposes. Now this weapon is

employed only for hunting, but it appears as if even for this purpose it would soon go out of use. Some of the natives, however, use the bow with great accuracy of aim. The bows which I procured commonly consisted of a badly worked, slightly bent, elastic piece of wood, with the ends drawn together by a skin thong. Only some old bows had a finer form. They were larger, and made with care; for instance, they were covered with birch-bark, and strengthened by an artistic plaiting of sinews on the outer side. The arrows are of many kinds, partly with bone or wooden, and partly with iron, points. Feathers are generally wanting. The shaft is a clumsily worked piece of wood. Crossbows are occasionally used. We have even seen bows for playthings, with carefully made, iron-pointed arrows. At the encampments near the winter station we found a couple of percussion-lock guns, with caps, powder and lead. They were evidently little used, and my attempt to induce the Chukches to undertake long journeys by promises of a gun with the necessary supply of powder and lead completely failed. When the Chukch, who carried our letters to Nischni Kolymsk, was after his return rewarded with a red shirt, a gun, caps, powder and ball, he wished to exchange the gun and ammunition for an axe.

The principal livelihood of the Chukches is derived from hunting and fishing. Both are very abundant at certain seasons of the year, but are less productive during the cold season, in which case, in consequence of the little forethought of the savage, there arises great scarcity both of food and fuel and the means of melting snow. Of their hunting and fishing implements I cannot give so complete accounts as I should wish, because they very carefully avoided taking any of the *Vega's* hunters with them on their hunting excursions.

The rough seal is taken with nets, made of strong seal-skin thongs. The nets are set in summer among the ground-ices along the shore. The animal gets entangled in the net and is

suffocated, as it can no longer come to the surface to breathe. In winter the seal is taken partly with nets in "leads" among the ice, partly with the harpoon when it crawls out of its hole; it is also taken by means of a noose of thongs placed over its hole. In order to avoid the loss of the valuable seal-blood, which is considered an extraordinary delicacy by the Chukches, the animal is never killed by an edged tool, if that can be avoided, but by repeated blows on the head. The bear is killed by the lance or knife, the latter, according to the statement of a Chukch, being the surest weapon; the walrus and the largest kind of seals with the harpoon (fig. 1, p. 105), or a lance resembling the Greenlander's. Even the whale is harpooned, but with a harpoon considerably larger than the common, and to which as many as six inflated seal-skins are fastened. In order to kill a whale a great many such harpoons must be struck into it. Birds are taken in snares, or killed with bird-javelins, arrows, and slings. The last mentioned (fig. 3, p. 105) consist of a number of round balls of bone fastened to leather thongs, which are knotted together. Some feathers are often fixed to the knot in order to increase the resistance of the air to this part of the sling. When the sling is thrown the bone balls are thereby scattered in all directions, and the probability of hitting becomes greater. Every man and boy in summer carries with him such a sling, often bound round his head, and is immediately prepared to cast it at flocks of birds flying past. Common slings are also used, consisting of two thongs and a piece of skin fastened to them. The bird-dart (fig. 5, p. 105) completely resembles that used by the Eskimo. A kind of snare was used by the boys at Yinretlen to catch small birds for our zoologist. They were made of whalebone fibres.

Fish are caught partly with nets, partly with the hook or with a sort of leister (fig. 6, p. 105). The nets are made of sinew-thread. I procured several of these, and was surprised at the small value which the natives set upon them, notwithstanding

the hard labour which must have been required for preparing the thread and making the net. The nets are also sometimes used as drift-nets. The fishing-rod consists of a shaft only thirty centimetres long, to which is fixed a short line made of sinews. The extreme end of the line passes through a large sinker of ivory, to which are attached two or three tufts each with its hook of bone only, or of bone and copper, or bone and iron. The hook has three or four points projecting in different directions. I have before described how the hook is used in autumn in fishing for roach, also how the productive fishing goes on in the neighbourhood of Tjapka.

Even for the coast Chukch reindeer flesh appears to form an important article of food. He probably purchases his stock of it from the reindeer-Chukches for train-oil, skin straps, walrus tusks, and perhaps fish. I suppose that part of the frozen reindeer blood, which the inhabitants of the villages at our winter station used for soup, had been obtained in the same way. Wild reindeer, or reindeer that had run wild, were hunted with the lasso. Such animals, however, do not appear now to be found in any large numbers on the Chukch peninsula.

Besides fish and flesh the Chukches consume immense quantities of herbs and other substances from the vegetable kingdom.[1] The most important of these are the leaves and young branches of a great many different plants (for instance Salix, Rhodiola, &c.) which are collected and after being cleaned are preserved in seal-skin sacks. Intentionally or unintentionally the contents of the sacks sour during the course of the summer. In autumn they freeze together to a lump of the form of the stretched seal-skin. The frozen mass is cut in pieces and used with flesh, much in the same way as we eat bread. Occasionally a vegetable

[1] An exhaustive treatise on the food-substances which the Chukches gather from the vegetable kingdom, written by Dr. Kjellman, is to be found in *The Scientific Work of the Vega Expedition*. Popov already states that the Chukches eat many berries, roots, and herbs (*Müller*, iii. p. 59).

soup is made from the pieces along with water, and is eaten warm. In the same way the contents of the reindeer stomach is used. Algæ and different kinds of roots are also eaten, among the latter a kind of wrinkled tubers, which, as already stated (Vol. I., p. 450) have a very agreeable taste.

In summer the Chukches eat cloud-berries, red bilberries, and other berries, which are said to be found in great abundance in the interior of the country. The quantity of vegetable matter which is collected for food at that season of the year is very considerable, and the natives do not appear to be very particular in their choice, if the leaves are only green, juicy, and free from any bitter taste. When the inhabitants, in consequence of scarcity of food, removed in the beginning of February from Pitlekaj, they carried with them several sacks of frozen vegetables, and there were still some left in the cellars to be taken away as required. In the tents at St. Lawrence Bay there lay heaps of leaf-clad willow-twigs and sacks filled with leaves and stalks of Rhodiola. The writers who quote the Chukches as an example of a race living exclusively on substances derived from the animal kingdom thus commit a complete mistake. On the contrary, they appear at certain seasons of the year to be more "graminivorous" than any other people I know, and with respect to this their taste appears to me to give the anthropologist a hint of certain traits of the mode of life of the people of the Stone Age which have been completely overlooked. To judge from the Chukches our primitive ancestors by no means so much resembled beasts of prey as they are commonly imagined to have done, and it may, perhaps, have been the case that "bellum omnium inter omnes" was first brought in with the higher culture of the Bronze or Iron Age.

The cooking of the Chukches, like that of most wild races, is very simple. After a successful catch all the dwellers in the tent gormandise on the killed animal, and appear to find a special pleasure in making their faces and hands as bloody as

possible. Alternately with the raw flesh are eaten pieces of blubber and marrow, and bits of the intestines which have been freed from their contents merely by pressing between the fingers. Fish is eaten not only in a raw state, but also frozen so hard that it can be broken in pieces. When opportunity offers the Chukches do not, however, neglect to boil their food, or to roast pieces of flesh over the train-oil lamp—the word *roast* ought however in this case to be exchanged for *soot*. At a visit which Lieutenant Hovgaard made at Najtskaj, the natives in the tent

STONE HAMMERS AND ANVIL FOR CRUSHING BONES.
(One-sixth of the natural size.)

where he was a guest ate for supper first seal-flesh soup, then boiled fish, and lastly, boiled seal-flesh. They thus observed completely the order of eating approved in Europe. The Chukches are unacquainted with other forks than their fingers, and even the use of the spoon is not common. Many carry about with them a spoon of copper, tinned iron, or bone (fig. 8, p. 117). The soup is often drunk directly out of the cooking vessel, or sucked up through hollow bones (see the figure on p. 104). These are used as drinking cups, and like the spoons

are worn in the belt. As examples of Chukch dishes I may further mention, vegetable soup, boiled seal-flesh, boiled fish, blood soup, soup of seal-blood and blubber. To these we may add soup from finely crushed bones, or from seal-flesh, blubber, and bones. For crushing the bones there is in every tent a hammer, consisting of an oval stone with a hollow round it for a skin thong, with which the stone is fastened to the short shaft of wood or bone. The bones which are used for food are finely crushed with this implement against a stone anvil or a whale's vertebra, and then boiled with water and blood, before being eaten. At first we believed that this dish was intended for the dogs, but afterwards I had an opportunity of convincing myself that the natives themselves ate it; and that long before the time when they suffered from scarcity of provisions. The hammer is further of interest as forming one of the stone implements which are most frequently found in graves from the Stone Age. That the hammer was mainly intended for kitchen purposes appears from the circumstance that the women alone had it at their disposal, and were consulted when it was parted with. Along with such hammers there was to be found in every tent an anvil, consisting of a whale's vertebra or a large round stone with a bowl-formed depression worn or cut out in the middle of it.

During winter a great portion of the inhabitants of Yinretlen, Pitlekaj, and as far as from Irgunnuk, came daily on board to beg or buy themselves provisions, and during this period they were fed mainly by us. They soon accustomed themselves to our food. They appeared specially fond of pea-soup and porridge. The latter they generally laid out on a snow-drift to freeze, and then took it in the frozen form to the tents. Coffee they did not care for unless it was well sugared. Salt they did not use, but with sugar they were all highly delighted. They also drank tea with pleasure. Otherwise water forms their principal drink. They were, however, often compelled in

winter, in consequence of the difficulty of melting over the train-oil lamps a sufficient quantity of snow, to quench their thirst with snow. On board they often asked for water, and drank at once large quantities of it.

Spirits, to which they are exceedingly addicted, they call, as has been already stated, in conversation with Europeans, "ram," the pronouncing of the word being often accompanied by a hawking noise, a happy expression, and a distinctive gesture, which consisted in carrying the open right hand from the mouth to the waist, or in counterfeiting the unintelligible talk of a drunken man. Among themselves they call it fire-water (*akmimil*). The promise of it was the most efficient means of getting an obstinate Chukch to comply with one's wishes. In case they undertook to drive us with their dog-teams, they were never desirous of finding out whether any stock of provisions was taken along, but warned by our parsimony in dealing out spirituous liquor, they were unwilling to start until they had examined the stock of "ram." That drunkenness, not the satisfying of the taste, was in this case the main object, is shown by the circumstance that they often fixed, as price for the articles they saw we were anxious to have, such a quantity of brandy as would make them completely intoxicated. When on one occasion I appeared very desirous of purchasing a fire-drill, which was found in a tent inhabited by a newly-wedded pair, the young and very pretty housewife undertook the negotiation, and immediately began by declaring that her husband could not part with the fire-producing implement unless I gave him the means of getting quite drunk, for which, according to her statement, which was illustrated by lively gesticulations representing the different degrees of intoxication, eight glasses were required. Not until the man had got so many would he be content, that is, dead drunk. I have myself observed, however, on several occasions that two small glasses are sufficient to make them unsteady on the legs. Under the influence of liquor they

are cheerful, merry, and friendly, but troublesome by their excessive caressing. When in the company of intoxicated natives, one must take good care that he does not unexpectedly get a kiss from some old greasy seal-hunter. Even the women readily took a glass, though evidently less addicted to intoxicants than the men. They however got their share, as did even the youngest of the children. When, as happened twice in the course of the winter, an encampment was fortunate enough to get a large stock of brandy sent it from Behring's Straits, the intoxication was general, and, as I have already stated, the bluish-yellow eyes the next day showed that quarrelsomeness had been called forth even among this peace-loving people by their dear *akmimil*. During our stay at the villages nearer Behring's Straits two murders even took place, of which one at least was committed by an intoxicated man.

However slight the contact the Chukches have with the world that has reached the standpoint of the brandy industry is, this means of enjoyment, however, appears to be the object of regular barter. Many of the Chukches who travelled past us were intoxicated, and shook with pride a not quite empty keg or seal-skin sack, to let us hear by the dashing that it contained liquid. One of the crew, whom I asked to ascertain what sort of spirit it was, made friends with the owner, and induced him at last to part with about a thimbleful of it; more could not be given. According to the sailor's statement it was without colour and flavour, clear as crystal, but weak. It was thus probably Russian corn brandy, not gin.

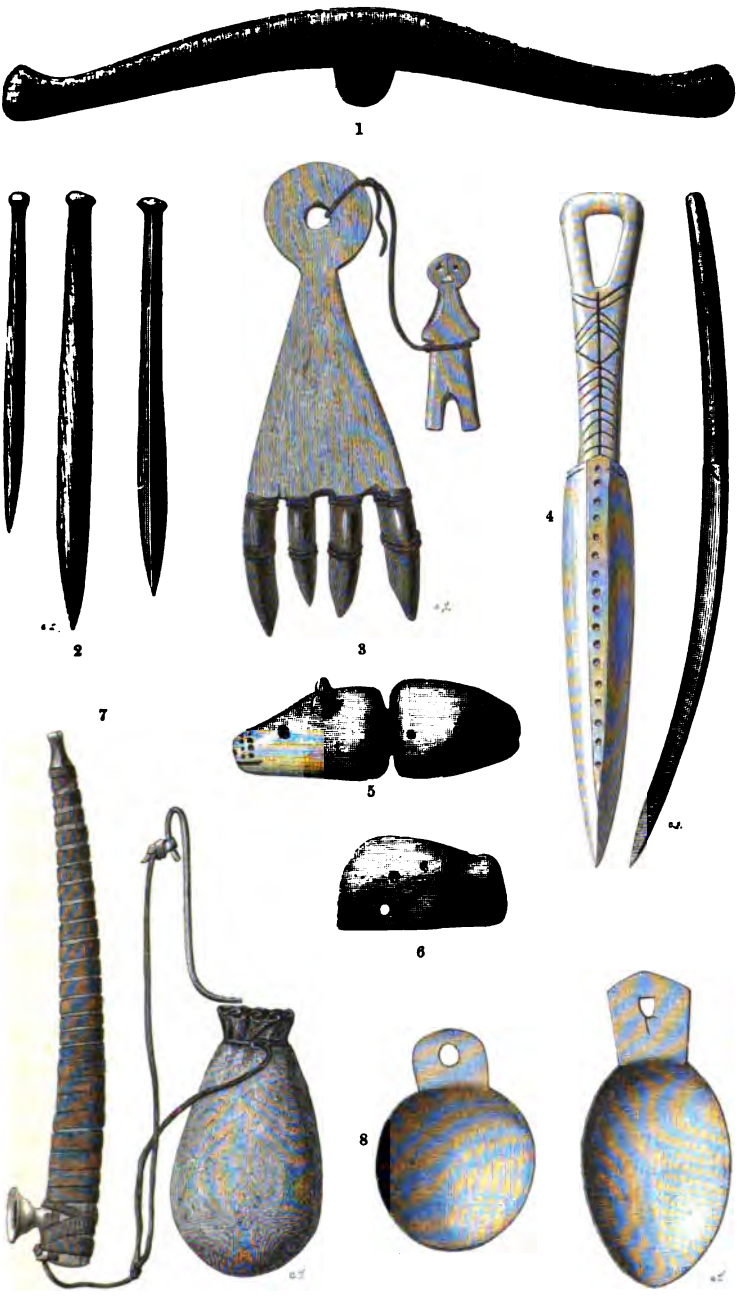
During a visit which Lieutenants Hovgaard and Nordquist made in the autumn of 1878 to the reindeer-Chukches in the interior of the country, much diluted American gin was on the contrary presented, and the tent-owner showed his guests a tin drinking-cup with the inscription, "Capt. Ravens, Brig *Timandra*, 1878." Some of the natives stated distinctly that they could purchase brandy at Behring's Straits all the year

round. All the men in the tent village, and most of the women, but not the children, had at the time got completely intoxicated in order to celebrate the arrival of the foreigners, or perhaps rather that of the stock of brandy. As there are no Europeans settled at Behring's Straits, at least on the Asiatic side, we learn from the traffic in brandy that there are actually natives abstemious enough to be able to deal in it.

Tobacco is in common use, both for smoking and chewing.[1] Every native carries with him a pipe resembling that of the Tunguse, and a tobacco-pouch (fig. 7, p. 117). The tobacco is of many kinds, both Russian and American, and when the stock of it is finished native substitutes are used. Preference is given to the sweet, strong chewing tobacco, which sailors generally use. In order to make the tobacco sweet which has not before been drenched with molasses, the men are accustomed, when they get a piece of sugar, to break it down and place it in the tobacco-pouch. The tobacco is often first chewed, then dried behind the ear, and kept in a separate pouch suspended from the neck, to be afterwards smoked. The pipes are so small that, like those of the Japanese, they may be smoked out with a few strong whiffs. The smoke is swallowed. Even the women and children smoke and chew, and they begin to do so at so tender an age that we have seen a child, who could indeed walk, but still sucked his mother, both chew tobacco, smoke, and take a "ram."

Some bundles of Ukraine tobacco, which I took with me for barter with the natives, put it into my power to procure a large number of contributions to the ethnological collection, which in the absence of other wares for barter I would otherwise have been unable to obtain. For the Chukches do not understand money. This is so much the more remarkable as they carry on

[1] Already, in the beginning of the eighteenth century, all the Siberian tribes, men and women, old and young, smoked passionately (*Hist. Généalog. des Tartares*, p. 66).



CHUKCH IMPLEMENTS.

1. Scraper for currying (one-seventh of the natural size). 2. Awls (one-half.) 3. Ice-scraper intended for decoying the seal from its hole, with bone amulet affixed (one-half). 4. Bone knife (one-half). 5, 6. Amulets of bone (natural size). 7. Pipe and tobacco-pouch (one-third). 8. Metal spoons (one-third).

a very extensive trade, and evidently are good mercantile men. According to von Dittmar (*loc. cit.* p. 129) there exists, or still existed in 1856, a steady, slow, but regular transport of goods along the whole north coast of Asia and America, by which Russian goods were conveyed to the innermost parts of Polar America, and furs instead found their way to the bazaars of Moscow and St. Petersburg. This traffic is carried on at five market places, of which three are situated in America, one on the islands at Behring's Straits, and one at Anjui near Kolyma. The last-mentioned is called by the Chukches "the fifth beaver market." [1]

The Chukches' principal articles of commerce consist of seal-skin, train-oil, fox-skins and other furs, walrus tusks, whalebone, &c. Instead they purchase tobacco, articles of iron, reindeer skin and reindeer flesh, and, when it can be had, spirit. A bargain is concluded very cautiously after long-continued consultation in a whispering tone between those present. I employed spirit as an article for barter only in the last necessity, but they soon observed that the desire to become owner of an uncommon article of art or antiquity overcame my determination, and they soon learned to avail themselves of this, especially as in all cases I made full payment for the article and gave the fire-water into the bargain.

The lamp (see the figures at pp. 22, 23), with which light is maintained in the tent, consists of a flat trough of wood, bone

[1] Dr. John Simpson gives good information regarding the American markets in his *Observations on the Western Esquimaux*. He enumerates three market places in America besides that at Behring's Straits. At the markets people are occupied also with dancing and games, which are carried on in such a lively manner that the market people scarcely sleep during the whole time. Matiuschin gives a very lively sketch of the market at Anjui, to which, in 1821, the Chukches still went fully armed with spears, bows, and arrows (Wrangel's *Reise*, i. p. 270), and a visit to it in 1868 is described by C. von Neumann, who took part as Astronomer in von Maydell's expedition to Chukch Land (*Eine Messe im Hochnorden; Das Ausland*, 1880, p. 861).

of the whale, soap-stone or burned clay, broader behind than before, and divided by an isolated toothed comb into two divisions. In the front division wicks of moss (Sphagnum sp.) are laid in a long thin row along the whole edge. Under the lamp there is always another vessel intended to receive the train-oil which may possibly be spilled.

In summer the natives also cook with wood in the open air or in the outer tent, in winter only in the greatest necessity in the latter. For they find the smoke, which the wood gives off in the close tent, unendurable. Although driftwood is to be found in great abundance on the beach, scarcity of train-oil was evidently considered by the natives as great a misfortune as scarcity of food. *Uinga eek*, no fuel (properly, no fire), was the constant cry even of those who drew loads of driftwood on board to earn bread for themselves. The circumstance that their fuel does not give off any smoke has the advantage that the eyes of the Chukches are not usually nearly so much attacked as those of the Lapps.

In the tent the women have always a watchful eye over the trimming of the lamp and the keeping up of the fire. The wooden pins she uses to trim the wick, and which naturally are drenched with train-oil, are used when required as a light or torch in the outer tent, to light pipes, &c. In the same way other pins dipped in train-oil are used.[1] Clay lamps are made by the Chukches themselves, the clay being well kneaded and moistened with urine. The burning is incomplete, and is indeed often wholly omitted.

Train-oil and other liquid wares are often kept in sacks of seal-skin, consisting of whole hides, out of which the body has been taken through the opening made by cutting off the head, and in which all holes, either natural or caused by the killing of

[1] I have seen such pins, also oblong stones, sooty at one end, which, after having been dipped in train-oil, have been used as torches, laid by the side of corpses in old Eskimo graves in north-western Greenland.

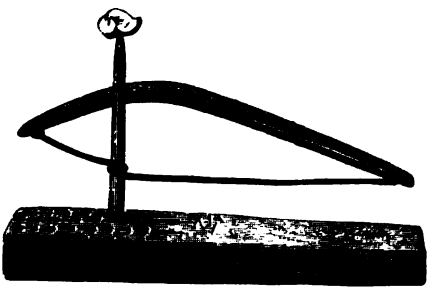
the animal, have been firmly closed. In one of the forepaws there is then inserted with great skill a wooden air- and water-tight cock with spigot and faucet. In sacks intended for dry wares the paws are also cut off, and the opening through which the contents are put in and taken out is made right across the breast immediately below the forepaws.

Fire is lighted partly in the way common in Sweden some decades ago by means of flint and steel, partly by means of a drill implement. In the former case the steel generally consists of a piece of a file or some other old steel tool, or of pieces of iron or steel which have been specially forged for the purpose. Commonly the form of this tool indicates a European or Russian-Siberian origin, but I also acquired clumsily hammered pieces of iron, which appeared to form specimens of native skill in forging. A Chukch showed me a large fire-steel of the last mentioned kind, provided with a special handle of copper beautifully polished by long-continued use. He evidently regarded it as a very precious thing, and I could not persuade him to part with it. On the supposition that the metal of the clumsily hammered pieces of iron might possibly be of meteoric origin I purchased as many of them as I could. But the examination, to which they were subjected after our return, showed that they contain no traces of nickel. The iron was thus not meteoric.

The flint consists of a beautiful chalcedony or agate, which has been formed in cavities in the volcanic rocks which occur so abundantly in north-eastern Asia, and which probably are also found here and there as pebbles in the beds of the *tundra* rivers. As tinder, are used partly the woolly hair of various animals, partly dry fragments of different kinds of plants. The steel and a large number of pieces of flint are kept in a skin pouch suspended from the neck. Within this pouch there is a smaller one, containing the tinder. It is thus kept warm by the heat of the body, and protected from wet by its double

envelope. Along with it the men often carry on their persons a sort of match of white, well-dried, and crushed willows, which are plaited together and placed in even rolls. This match burns slowly, evenly, and well.

The other sort of fire-implement consists of a dry wooden pin, which by a common bow-drill is made to rub against a block of dry half-blackened wood. The upper part of this pin runs in a drill block of wood or bone. In one of the tools which I purchased, the astragalus of a reindeer was used for this purpose. In the light-stock holes have been made to give support to the pin, and perhaps to facilitate the formation of the



FIRE-DRILL.
One-eighth of the natural size.

half-carbonised wood-meal which the drilling loosens from the light-stock and in which the red heat arises. When fire is to be lighted by means of this implement, the lower part of the drill pin is daubed over with a little train-oil, one foot holds the light-stock firm against the ground, the bowstring is put round the drill pin, the left hand presses the pin with the drill block against the light-stock, and the bow is carried backwards and forwards, not very rapidly, but evenly, steadily, and uninterruptedly, until fire appears. A couple of minutes are generally required to complete the process. The women appear to be more accustomed than the men to the use of this

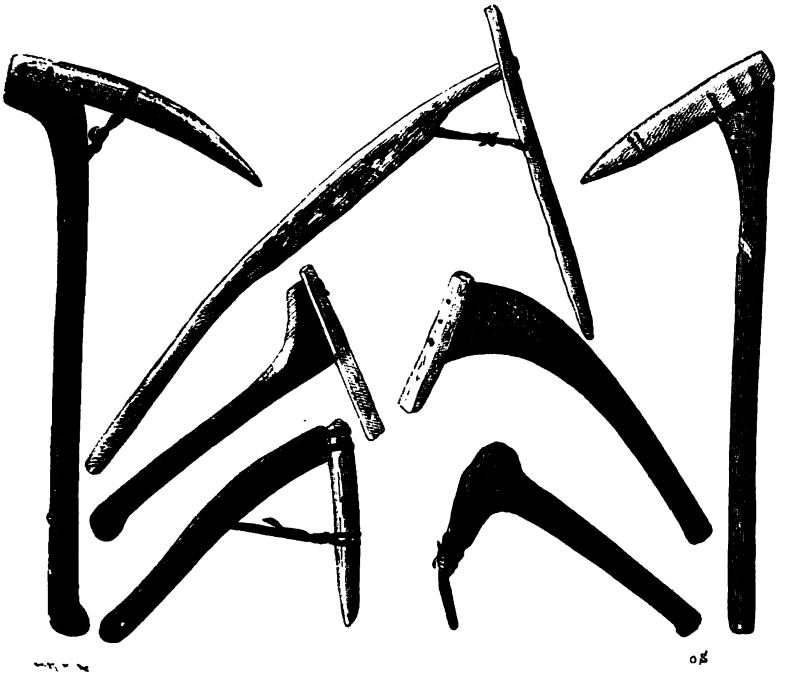
implement. An improved form of it consisted of a wooden pin on whose lower part a lense-formed and perforated block of wood was fixed. This block served as fly-wheel and weight. Across the wooden pin ran a perforated cross-bar which was fastened with two sinews to its upper end. By carrying this cross-bar backwards and forwards the pin could be turned round with great rapidity. The implement appears to me the more remarkable as it shows a new way of using the stone or brick lenses, which are often found in graves or old house-sites from the Stone Age.

Among the Chukches, as among many other wild races, lucifer matches have obtained the honour of being the first of the inventions of the civilised races that have been recognised as indisputably superior to their own. A request for lucifer matches was therefore one of the most common of those with which our friends at Behring's Straits tormented us during winter, and they were willing for a single box to offer things that in comparison were very valuable. Unfortunately we had no superfluous supply of this necessary article, or perhaps I ought to say fortunately, for if the Chukches for some years were able to get a couple of boxes of matches for a walrus tusk, I believe that with their usual carelessness they would soon completely forget the use of their own fire-implements.

Among household articles I may further mention the following:—

The *hide-scraper* (fig. 1, p. 117) is of stone or iron and fastened to a wooden handle. With this tool the moistened hide is cleaned very particularly, and is then rubbed, stretched, and kneaded so carefully that several days go to the preparation of a single reindeer skin. That this is hard work is also shown by the woman who is employed at it in the tent dripping with perspiration. While thus employed she sits on a part of the skin and stretches out the other part with the united help of the hands and the bare feet. When the skin has been

sufficiently worked, she fills a vessel with her own urine, mixes this with comminuted willow bark, which has been dried over the lamp, and rubs the blood-warm liquid into the reindeer skin. In order to give this a red colour on one side, the bark of a species of Pinus (?) is mixed with the tanning liquid. The skins are made very soft by this process, and on the inner side



ICE MATTOCKS.

One-ninth of the natural size.

almost resemble chamois leather. Sometimes too the reindeer skin is tanned to real chamois of very excellent quality.

Two sorts of *ice mattocks;* the shaft is of wood, the blade of the spade-formed one of whalebone, of the others of a walrus tusk; it is fixed to the shaft by skin thongs with great skill.

Sometimes both the shaft and blade are of bone, fastened together in a somewhat different way.

Hones of native clay-slate. These are often perforated at one end and carried along with the knife, the spoon, and the sucking-tube, fastened with an ivory tongs in the belt.

Home-made *vessels of wood, bone of the whale, whalebone, and skin* of different kinds.

Knives, boring tools, axes and pots of European, American, or Siberian origin, and in addition casks, pieces of cable, iron scrap, preserved-meat tins, glasses, bottles, &c., obtained from ships which have anchored along the coast. Vessels have regularly visited the sea north of Behring's Straits only during the latest decades, and the contact between the sailors and the Chukches has not yet exerted any considerable influence on the mode of life of the latter. The natives, however, complain that the whalers destroy the walrus-hunting, while on the other hand they see with pleasure trading vessels occasionally visiting their coasts.

During our stay off the considerable encampment, Irkaipij, we believed, as I have already stated, that we had found a chief in a native named Chepurin, who, to judge by his dress, appeared to be somewhat better off than the others, had two wives and a stately exterior. He was accordingly entertained in the gun-room, got the finest presents, and was in many ways the object of special attention. Chepurin took his elevation easily, and showed himself worthy of it by a grave and serious, perhaps somewhat condescending behaviour, which further confirmed our supposition and naturally increased the number of our presents. Afterwards, however, we were quite convinced that we had in this case committed a complete mistake, and that now there are to be found among the Chukches living at the coast neither any recognised chiefs nor any trace of social organisation. During the former martial period of the history of the race the state of things here was perhaps different, but now the

most complete anarchy prevails here, if by that word we may denote a state of society in which disputes, crimes, and punishments are unknown, or at least exceedingly rare.[1] A sort of chieftainship appears, at all events, to be found among the reindeer-Chukches living in the interior of the country. At least there are among them men who can show commissions from the Russian authorities. Such a man was the starost Menka, of whose visit I have already given an account. Everything, however, indicated that his influence was exceedingly small. He could neither read, write, nor speak Russian, and he had no idea of the existence of a Russian Czar. All the tribute he had delivered for several years, according to receipts which he showed to us, consisted of some few fox-skins, which he had probably received as market-tolls at Anjui and Markova. Menka was attended on his visit to the vessel by two ill-clad men with a type of face differing considerably from that common among the Chukches. Their standing appeared to be so inferior that we took them for slaves, although mistakenly, at least with respect to one of them—Yettugin. He afterwards boasted that he owned a much larger reindeer-herd than Menka's, and talked readily, with a certain scorn, of Menka's chieftain pretensions. According to Russian authors there are actual slaves, probably the descendants of former prisoners of war, among the Chukches in the interior of the country. Among the dwellers on the

[1] In the accounts which were collected regarding the Chukches at Anadyrsk in the beginning of the eighteenth century, it is also stated that they lived without any government. On the contrary, in M. von Krusenstern's *Voyage autour du monde, 1803-1806* (Paris, 1821, ii. p. 151), a report of Governor Koscheleff is given on some negotiations which he had with a "chief of the whole Chukch nation." I take it for granted that the chiefship was of little account, and Koscheleff's whole sketch of his meeting with the supposed chief bears an altogether too lively European romantic stamp to be in any degree true to nature. At the same place it is also said that a brother of Governor Koscheleff, in the winter of 1805-1806, made a journey among the Chukches, on which, after his return, he sent a report, accompanied by a Chukch vocabulary, to von Krusenstern.

coast, on the contrary, there is the most complete equality. We could never discover the smallest trace of any man exercising the least authority beyond his own family or his own tent.

The coast Chukches are not only heathens, but are also, so far as we could observe, devoid of every conception of higher beings. There are, however, superstitions. Thus most of them wear round the neck leather straps, to which small wooden tongs, or wooden carvings, are fixed. These are not parted with, and are not readily shown to foreigners. A boy had a band of beads sewed to his hood, and in front there was fastened an ivory carving, probably intended to represent a bear's head (fig. 6, on p. 117). It was so small, and so inartistically cut, that a man could undoubtedly make a dozen of them in a day. I, however, offered the father unsuccessfully a clasp-knife and tobacco for it, but the boy himself, having heard our bargaining, exchanged it soon after for a piece of sugar. When the father knew this he laughed good-naturedly, without making any attempt to get the bargain undone.

To certain tools small wooden images are affixed, as to the scraper figured above (fig. 3, p. 117), and similar images are found in large numbers in the lumber-room of the tent, where pieces of ivory, bits of agate and scrap iron, are preserved. A selection from the large collection of such images which I made is here reproduced in woodcuts. If, also, these carvings may, in fact, be considered as representations of higher beings, the religious ideas which are connected with them, even judged from the Shaman standpoint, are exceedingly indistinct, less a consciousness, which still lives among the people, than a reminiscence from former times. Most of the figures bear an evident stamp of the present dress and mode of life of the people. It appears to me to be remarkable, that in all the bone or wood carvings I have met with, the face has been cut flatter than it is in reality in this race of men. Some of the carvings appear to remind me of an ancient Buddhist image.

HUMAN FIGURES.

Nos. 1, 3, and 5, represent women with tattooed faces. No 4 is of wood. No. 6 of wood with eyes of tin; the rest are of ivory.

The drum, or more correctly, tambourine, so common among most of the Polar peoples, European, Asiatic, and American; among the Lapps, the Samoyeds, the Tunguses, and the Eskimo (see drawing on p. 24), is found in every Chukch tent. A certain superstition is also attached to it. They did not willingly play it in our presence, and they were unwilling to part with it. If time permitted it was concealed on our entrance into the tent. The drum consists of the peritoneum of a seal, stretched over a narrow wooden ring fixed to a short handle. The drum-stick consists of a splinter of whalebone 300 to 400 millimetres long, which towards the end runs into a point so fine and flexible, that it forms a sort of whipcord. When the thicker part of the piece of whalebone is struck against the edge of the drum-skin, the other end whips against the middle, and the skin is thus struck twice at the same time. The drum is commonly played by the man, and the playing is accompanied by a very monotonous song. We have not seen it accompanied by dancing, twisting of the countenance, or any other Shaman trick.

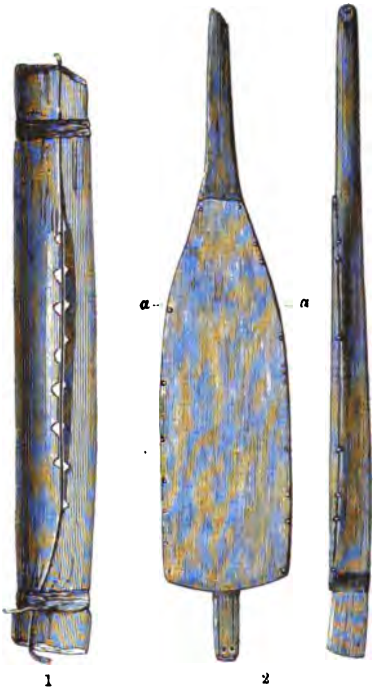
We did not see among the Chukches we met with any Shamans. They are described by Wrangel, Hooper, and other travellers. Wrangel states (vol. i. p. 284) that the Shamans in the year 1814, when a severe epidemic broke out among the Chukches and their reindeer at Anjui, declared that in order to propitiate the spirits they must sacrifice Kotschen, one of the most highly esteemed men of the tribe. He was so much respected that no one would execute the sentence, but attempts were made to get it altered, first by presents to the prophets, and then by flogging them. But when this did not succeed, as the disease continued to ravage, and no one would execute the doom, Kotschen ordered his own son to do it. He was thus compelled to stab his own father to death and give up the corpse to the Shamans. The whole narrative conflicts absolutely with the disposition and manners of the people with whom we made acquaintance at Behring's Straits sixty-five years after

this occurrence, and I would be disposed to dispute entirely the truthfulness of the statement, had not the history of our own part of the world taught us that blood has flowed in streams for dogmatic hair-splittings, which no one now troubles himself about. Perhaps the breath of indifferentism has reached even the ice-deserts of the Polar lands.

The drum has besides also another use, which appears to have little connection with its property of Shaman psychograph or church bell. When the ladies unravel and comb their long black hair, this is done carefully over the drum, on whose bottom the numerous beings which the comb brings with it from the warm hearth of home out into the cold wide world, are collected and cracked—in case they are not eaten up. They taste well according to the Chukch opinion, and are exceedingly good for the breast. Even *gorm* (the large, fully developed, fat larva of the reindeer fly, *Oestrus tarandi*) is pressed out of the skin of the reindeer and eaten; as well as the full-grown reindeer fly.

Some more of the superstitious traits which we observed among the Chukches may here be stated. After the good hunting in February we endeavoured without success to induce the Chukches to give us a head or a skull of some of the seals they had killed. Even brandy was unsuccessfully offered for it, and it was only in the greatest secrecy that Notti, one of our best friends from Irgunnuk, dared to give us the fœtus of a seal. A raven was once shot in the neighbourhood of the ice-house. The shot then went to the magnetical observatory, but before he entered, laid down the shot bird, the gun, and other articles in the before-mentioned implement chest placed in front of the observatory. A short time after there was great excitement before the tent. Some men, women, and children among the natives crowded round the chest screaming and shouting. For the Chukches had observed that the raven, having been only stunned by the shot, had begun to scream and flutter in the chest,

and they now indicated by word and gesture that a great misfortune was about to happen. Pity is not, as is well known, one of the good qualities of the savage. It was clear that in this case too it was not this feeling, but fear of the evil which the wounded crow could bring about, that caused this scene, and when a sailor immediately after twisted the neck of the bird, the Chukches had no objection to receive and eat it.



MUSICAL INSTRUMENTS.

1. Whistle-pipe, natural size. 2. Whistle-instrument, one-eighth of natural size: *a*. mouth-hole.

The winter of 1878-1879 appears to have been uncommonly severe, and hunting less productive than usual. This was ascribed to our presence. The Chukches asked us anxiously several times, whether we intended to raise the water so high that the sea would reach their tents. When on the 11th February, after the hunting had failed for a long time, they succeeded at last in catching a number of seals, they threw water in their mouths before they were carried into the tents. This was done, they said, in order that the open "leads" in the ice should not close too soon.

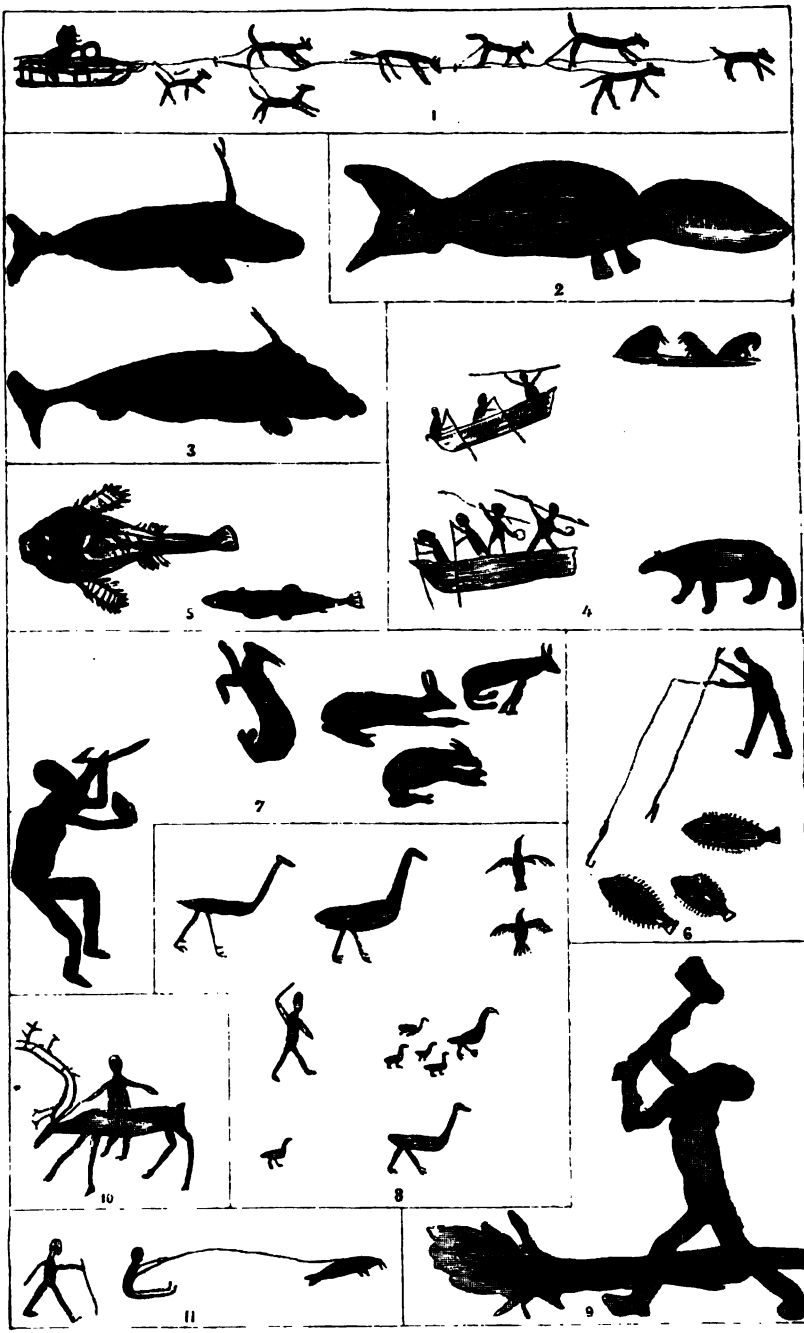
Besides the drum the Chukches also use as a musical instrument a piece of wood, cloven into two halves, and again united after the crack has been somewhat widened in the middle, with a piece of whalebone inserted between the two halves. They also during the course of the winter made several attempts to

make violins after patterns seen on board, and actually succeeded in making a better sounding-box than could have been expected beforehand. On the draught-strap of the dog sledge there was often a small bell bought from the Russians, and the reindeer-Chukches are said sometimes to wear bells in the belt.

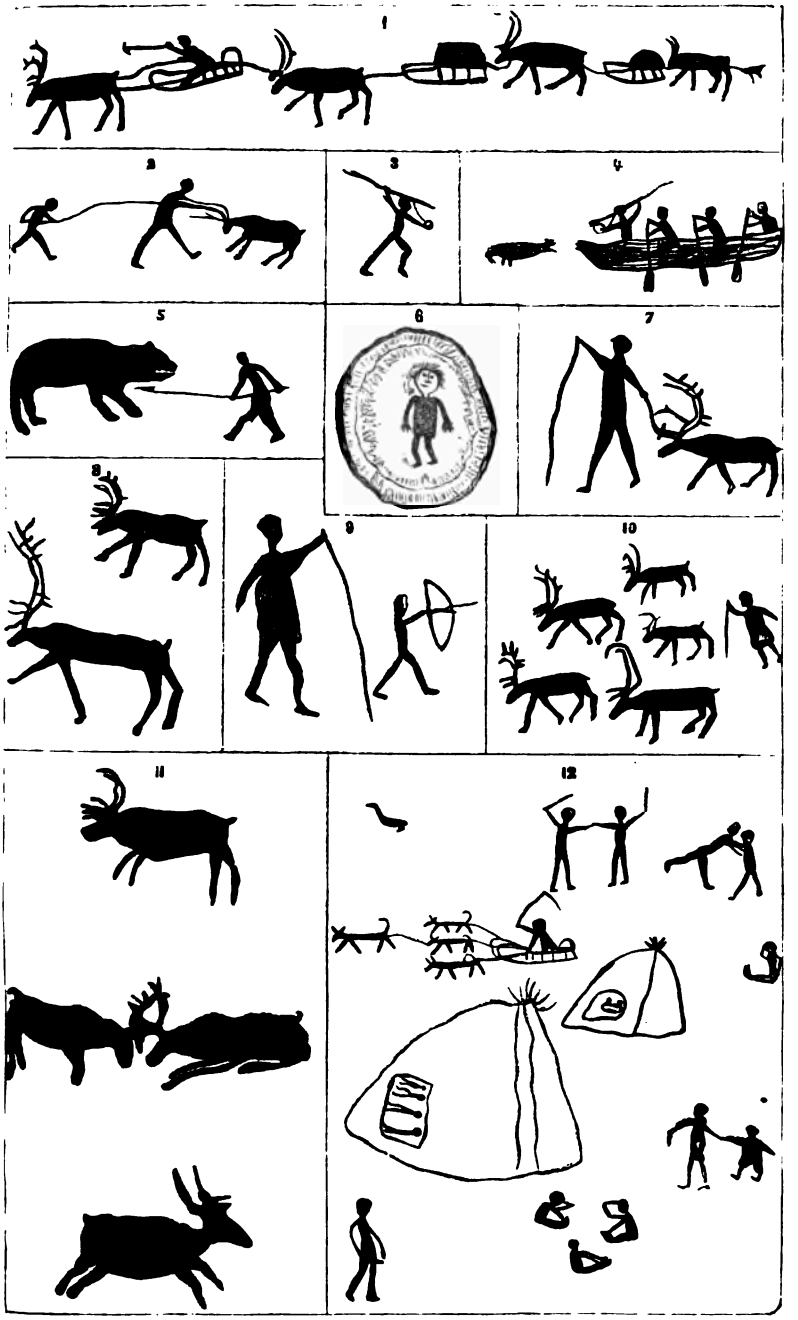
The dance I saw consisted in two women or children taking each other by the shoulders, and then hopping now on the one foot now on the other. When many took part in the dance, they placed themselves in rows, sang a monotonous, meaningless song, hopped in time, turned the eyes out and in, and threw themselves with spasmodic movements, clearly denoting pleasure and pain, now to the right, now to the left. "La saison" for dance and song, the time of slaughtering reindeer, however, did not happen during our stay, on which account our experience of the Chukches' abilities in this way is exceedingly limited.

All sport they entered into with special delight; for instance, some trial shooting which Palander set on foot on New Year's Day afternoon, with a small rifled cannon on the *Vega*. At first the women sat aft with the children, far from the dreadful shooting weapon, and indicated their feelings by almost the same gestures as on such occasions are wont to distinguish the weaker and fairer sex of European race. But soon curiosity took the upper hand. They pressed forward where they could see best, and broke out in a loud "Ho, ho, ho!" when the shot was fired and the shells exploded in the air.

Of what sort is the art-sense of the Chukches? As they still almost belong to the Stone Age, and as their contact with Europeans has been so limited that it has not perhaps conduced to alter their taste and skill in art, this question appears to me to have a great interest both for the historian of art, who here obtains information as to the nature of the seed from which at last the skill of the master has been developed in the course of ages and millenniums, and for the archæologist, who finds here a starting



DRAWINGS MADE BY CHUKCHES.



DRAWINGS MADE BY CHUKCHES.

point for forming a judgment both of the Scandinavian rock-etchings and the palæolithic drawings, which in recent times have played so great a part in enabling us to understand the oldest history of the human race. We have therefore zealously collected all that we could of Chukch carvings, drawings, and patterns. The most remarkable of these in one respect or another are to be found delineated in the woodcuts on the preceding pages.[1]

Many of the ivory carvings are old and worn, showing that they have been long in use, probably as amulets. Various of the animal images are the fruit of the imagination, and as such may be instructive. In general the carvings are clumsy, though showing a distinctive style. If we compare them with the Samoyed images we brought home with us, it appears that the genius of the Chukches for art has reached an incomparably higher development than that of the Polar race which inhabits the western portion of the north coast of Asia; on the other hand, they are in this respect evidently inferior to the Eskimo at Port Clarence. The Chukch drawings too are roughly and clumsily executed, but many of them exhibit a certain power of hitting off the object. These figures appear to me to show that the objections which have been raised to the genuineness of various palæolithic etchings, just on the ground of the artist's comparatively sure hand, are not justified. Even patterns and ivory buckles show a certain taste. Embroidery is done commonly on

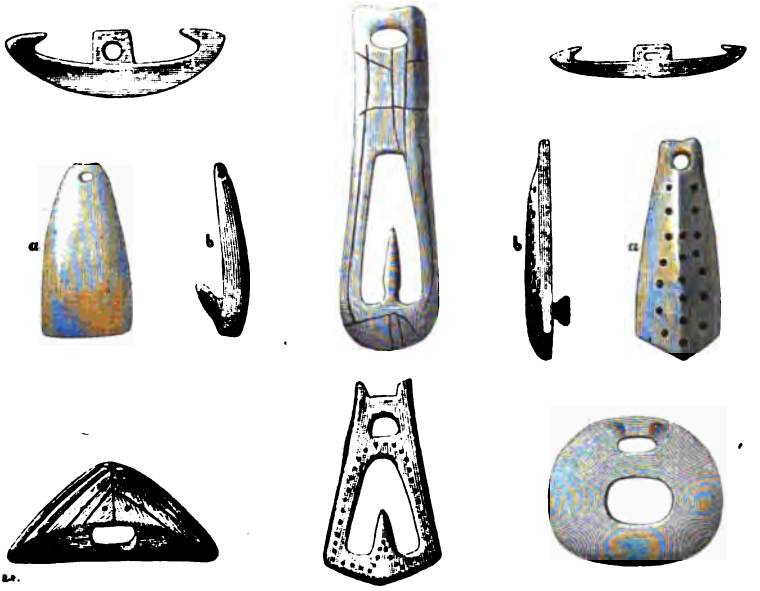
[1] The originals of the drawings reproduced in the woodcuts are made on paper, part with the lead pencil, part with red ochre. The different groups represent *on the first page*—1, a dog-team; 2, 3, whales; 4, hunting the Polar bear and the walrus; 5, bullhead and cod; 6, man fishing; 7, hare-hunting; 8, birds; 9, wood-chopper; 10, man leading a reindeer; 11, walrus hunt—7 and 9 represent Europeans. *On the second page*—1, a reindeer train; 2, a reindeer taken with a lasso by two men; 3, a man throwing a harpoon; 4, seal hunt from boat; 5, bear hunt; 6, the man in the moon; 7, man leading a reindeer; 8, reindeer; 9, Chukch with staff and an archer; 10, reindeer with herd; 11, reindeer; 12, two tents, man riding on a dog sledge, &c.

red-coloured strips of skin partly with white reindeer hair, partly with red and black wool, obtained in small quantity by barter from Behring's Straits. The supply of colouring material is not particularly abundant. It is obtained partly from the mineral kingdom (limonite of different colours, and graphite), partly from the vegetable kingdom (bark of various trees). The mineral colours are ground with water between flat stones. Bark is probably treated with urine. Red is the Chukches' favourite colour.

In order to make a contribution towards an answer to the disputed question, in what degree is the colour-sense developed among savages, Dr. Almquist during the course of the winter instituted comprehensive researches according to the method worked out by Professor FR. HOLMGREN. A detailed account of these is to be found in *The Scientific Work of the Vega Expedition*, and in various scientific journals. Here I shall only state that Dr. Almquist gives the following as the final result of his investigation: "That the Chukches in general possess as good an organ for distinguishing colours as we Swedes. On the other hand, they appear not to be accustomed to observe colours, and to distinguish sharply any other colour than red. They bring together all reds as something special, but consider that green of a moderate brightness corresponds less with a green of less brightness than with a blue of the same brightness. In order to bring all greens together the Chukches thus require to learn a new abstraction." Of 300 persons who were examined, 273 had a fully developed colour-sense, nine were completely colour-blind, and eighteen incompletely colour-blind, or gave uncertain indications.

From what has been stated above it appears that the coast Chukches are without noteworthy religion, social organisation, or government. Had not experience from the Polar races of America taught us differently we should have believed that with

such a literally anarchic and godless crew there would be no security for life and property, immorality would be boundless, and the weaker without any protection from the violence of the stronger sex. This, however, is so far from being the case that criminal statistics have been rendered impossible for want of crimes, if we except acts of violence committed under the influence of liquor.



CHUKCH BUCKLES AND HOOKS OF IVORY.
Half the natural size

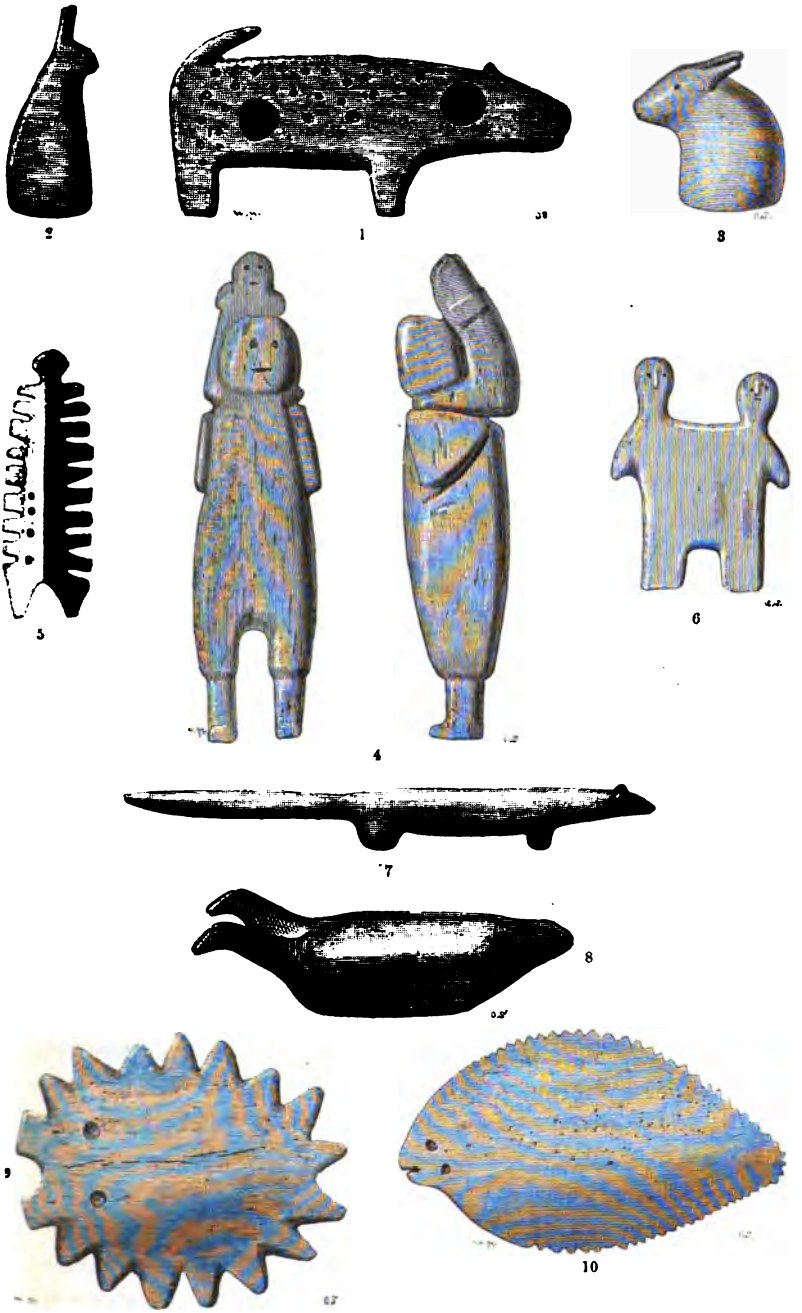
During the winter the *Vega* was visited daily, as has been stated in the account of the wintering, by the people from the neighbouring villages, while our vessel at the same time formed a resting-place for all the equipages which travelled from the western tent-villages to the islands in Behring's Straits, and *vice versâ*. Not only our neighbours, but people from a distance whom we had never seen before, and probably would not see

again, came and went without hindrance among a great number of objects which in their hands would have been precious indeed. We had never any cause to regret the confidence we placed in them. Even during the very hard time, when hunting completely failed, and when most of them lived on the food which was served out on board, the large *dépôt* of provisions, which we had placed on land without special watch, in case any misfortune should befall our vessel, was untouched. On the other hand, there were two instances in which they secretly repossessed themselves of fish they had already sold, and which were kept in a place on deck accessible to them. And with the most innocent countenance in the world they then sold them over again. This sort of dishonesty they evidently did not regard as theft but as a permissible commercial trick.

This was not the only proof that the Chukches consider deception in trade not only quite justifiable, but almost creditable. While their own things were always made with the greatest care, all that they did specially for us was done with extreme carelessness, and they were seldom pleased with the price that was offered, until they became convinced that they could not get more. When they saw that we were anxious to get ptarmigan, they offered us from their winter stock under this name the young of *Larus eburneus*, which is marked in the same way, but of little use as food. When I with delight purchased this bird, which in its youthful dress is rare, and therefore valuable to the ornithologist, a self-satisfied smile passed over the countenance of the seller. He was evidently proud of his successful trick. Some prejudice, as has been already stated, prevented the Chukches from parting with the heads of the seal, though, in order to ascertain the species existing here, we offered a high price for them. "Irgatti" (to-morrow), or "Isgatti," if the promise was given by a woman, was the usual answer. But the promise was never kept. At last a boy came and gave us a skull, which he said belonged to a seal. On a more minute

examination, however, it was found not to have belonged to a seal, but to an old dog, whose head it was evidently thought might, without any damage to the hunting, be handed over to the white magicians. This time it went worse with the counterfeitor than in the case of the ptarmigan bargain. For a couple of my comrades undertook to make the boy ashamed in the presence of the other Chukches, saying with a laugh "that he, a Chukch, must have been very stupid to commit such a mistake," and it actually appeared as if the scoff had in this case fallen into good ground. Another time, while I was in my watch in the ice-house, there came a native to me and informed me that he had driven a man from Irgunnuk to the vessel, but that the man had not paid him, and asked me on that account to give him a box of matches. When I replied that he must have been already well paid on the vessel for his drive, he said in a whining tone, "only a very little piece of bread." He was not the least embarrassed when I only laughed at the, as I well knew, untruthful statement, and did not give him what he asked.

The Chukches commonly live in monogamy; it is only exceptionally that they have two wives, as was the case with Chepurin, who has been already mentioned. It appeared as if the wives were faithful to their husbands. It was only seldom that cases occurred in which women, either in jest or earnest, gave out that they wished a white man as a lover. A woman not exactly eminent for beauty or cleanliness said, for instance, on one occasion, that she had had two children by Chukches, and now she wished to have a third by one of the ship's folk. The young women were modest, often very pretty, and evidently felt the same necessity of attracting attention by small coquettish artifices as Eve's daughters of European race. We may also understand their peculiar pronunciation of the language as an expression of feminine coquetry. For when they wish to be attractive they replace the man's *r*-sound with a soft



CHUKCH BONE CARVINGS

1. Dog, natural size. 2, 3. Hares, natural size. 4. Woman carrying her child on her shoulders, two-thirds. 5. Mollusc from the inland lakes (Branchypus?), natural size. 6. Monster, natural size. 7. Fox, natural size. 8. Animal with three heads, two-thirds. 9 Asterid, natural size. 10. Fish, natural size.

s; thus, *korang* (reindeer) is pronounced by the women *kosang*, *tirkir* (the sun) *tiskis*, and so on.

The women work very hard. Not only the management of the children, the cooking, the melting of the ice, the putting the tent in order, the sewing, and other "woman's work," lie to their hand, but they receive the catch, in winter in the tent, in summer at the beach, cut it in pieces, help with the fishing, at least when it is in the neighbourhood of the tent, and carry out the exceedingly laborious tanning of the hides, and prepare thread from sinews. In summer they collect green plants in the meadows and hill-slopes in the neighbourhood of the tents. They are therefore generally at home, and always busy. The men have it for their share to procure for their family food from the animal kingdom by hunting and fishing. With this purpose in view they are often out on long excursions. In the tent the man is for the most part without occupation, sleeps, eats, gossips, chats with his children, and so on, if he does not pass the time in putting his hunting implements in order in a quite leisurely manner.

Within the family the most remarkable unanimity prevails, so that we never heard a hard word exchanged, either between man and wife, parents and children, or between the married pair who own the tent and the unmarried who ocasionally live in it. The power of the woman appears to be very great. In making the more important bargains, even about weapons and hunting implements, she is, as a rule, consulted, and her advice is taken. A number of things which form women's tools she can barter away on her own responsibility, or in any other way employ as she pleases. When the man has by barter procured a piece of cloth, tobacco, sugar, or such like, he generally hands it over to his wife to keep.

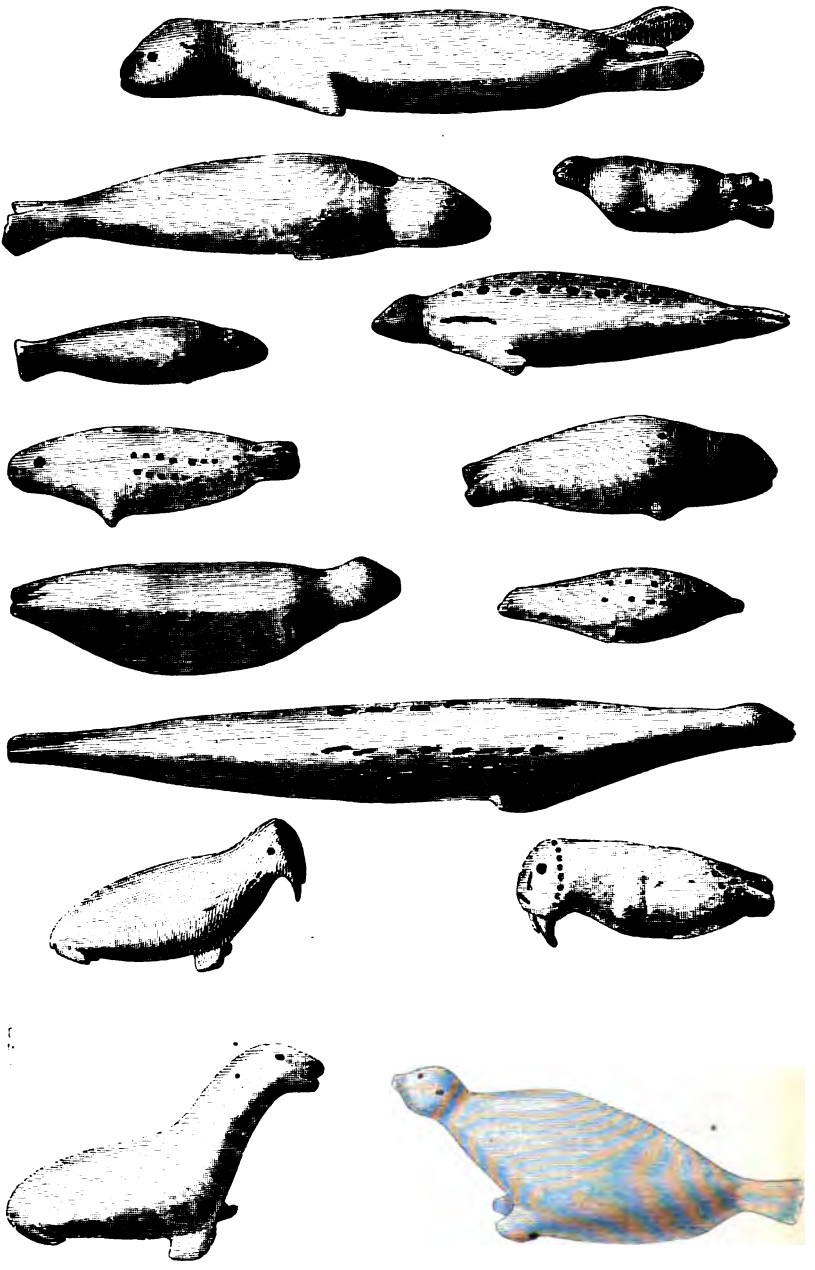
The children are neither chastised nor scolded; they are, however, the best behaved I have ever seen. Their behaviour in the tent is equal to that of the best-brought-up European

children in the parlour. They are not, perhaps, so wild as ours, but are addicted to games which closely resemble those common among us in the country. Playthings are also in use, for instance, dolls, bows, windmills with two sails, &c. If the parents get any delicacy they always give each of their children a bit, and there is never any quarrel as to the size of each child's portion. If a piece of sugar is given to one of the children in a crowd it goes from mouth to mouth round the whole company. In the same way the child offers its father and mother a taste of the bit of sugar or piece of bread it has got. Even in childhood the Chukches are exceedingly patient. A girl who fell down from the ship's stair, head foremost, and thus got so violent a blow that she was almost deprived of hearing, scarcely uttered a cry. A boy, three or four years of age, much rolled up in furs, who fell down into a ditch cut in the ice on the ship's deck, and in consequence of his inconvenient dress could not get up, lay quietly still until he was observed and helped up by one of the crew.

CHUKCH DOLL.
One-eighth of the natural size.

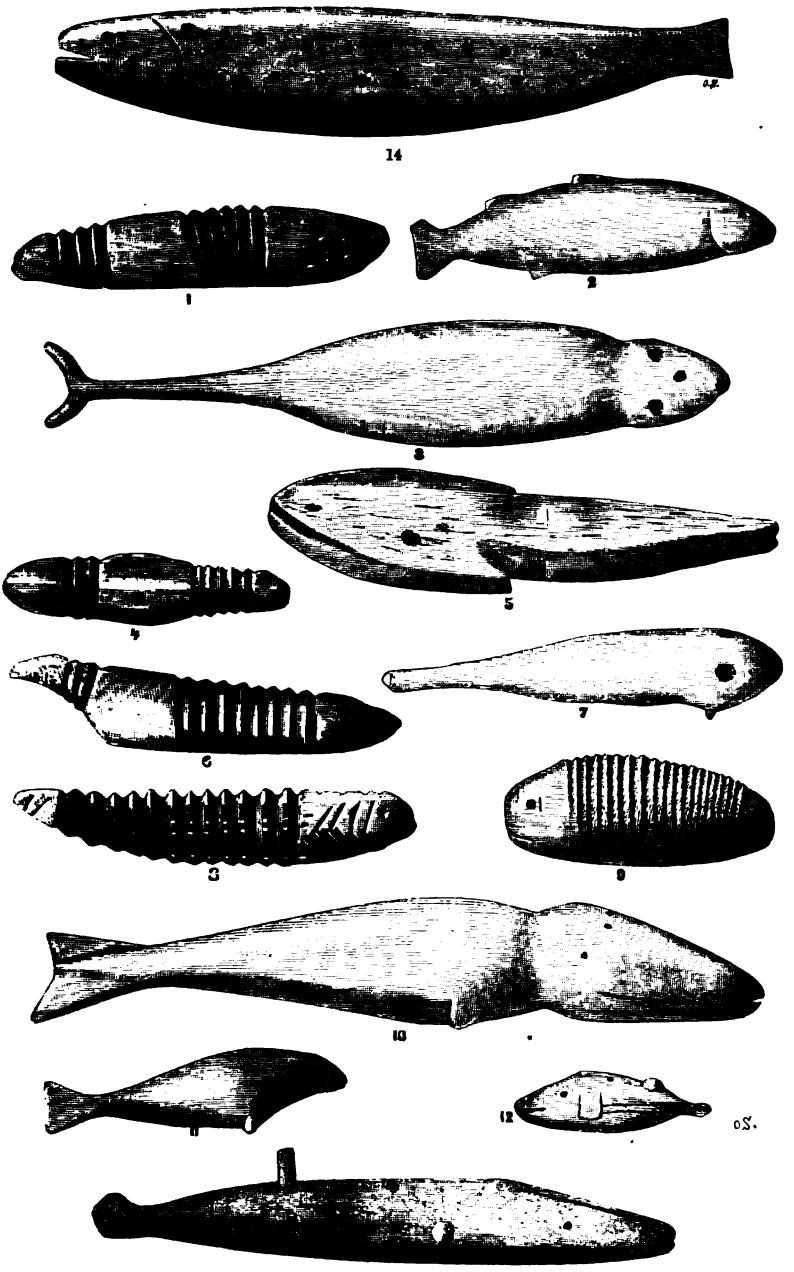
The Chukches' most troublesome fault is a disposition to begging that is limited by no feeling of self-respect. This is probably counterbalanced by their unbounded hospitality and great kindness to each other, and is, perhaps, often caused by actual necessity. But they thus became veritable torments, putting to a hard test the patience, not only of the scientific men and officers, but also of the crew. The good nature with which our sailors met their demands was above all praise.

There was never any trace of disagreement between the natives and us, and I have every reason to suppose that our



CHUKCH BONE CARVINGS.

Seals, walrusses, a sea-bear (the lowest figure to the left). The four lowest are of the natural size, the others two-thirds of the natural size.



13

CHUKCH BONE CARVINGS.

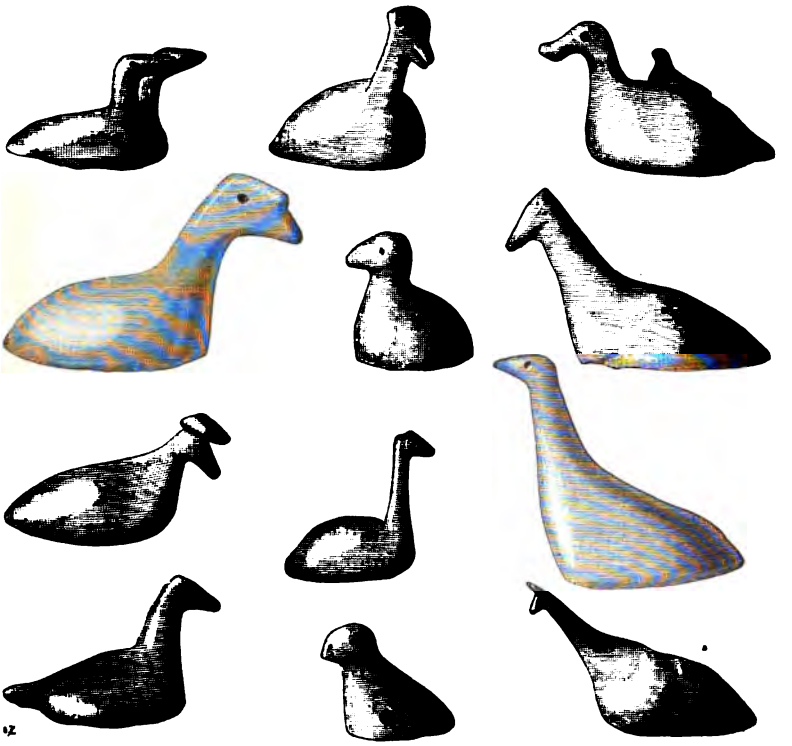
Fishes, larvæ of flies (*gorm*), molluscs, and whales. Nos. 1 to 9 and 14, natural size. Nos. 10 to 13, two-thirds of the natural size.

wintering will long be held in grateful remembrance by them, especially as, in order not to spoil their seal-hunting, I strictly forbade all unnecessary interference with it.

It is probably impossible for a Chukch to take the place of a European workman. It has, however, happened that Chukches have gone with whalers to the Sandwich Islands, and have become serviceable seamen. During our wintering two young men got accustomed to come on board and there to take a hand, in quite a leisurely way, at work of various kinds, as sawing wood, shovelling snow, getting ice on board, &c. In return they got food that had been left over, and thus, for the most part, maintained not only themselves, but also their families, during the time we remained in their neighbourhood.

If what I have here stated be compared with Sir EDWARD PARRY'S masterly sketches of the Eskimo at Winter Island and Iglolik, and Dr. SIMPSON'S of the Eskimo in North-western America, or with the numerous accounts we possess of the Eskimo in Danish Greenland, a great resemblance will be found to exist between the natural disposition, mode of life, failings and good qualities of the Chukches, the savage Eskimo, and the Greenlanders. This resemblance is so much more striking, as the Chukch and the Eskimo belong to different races, and speak quite different languages, and, as the former, to judge by old accounts of this people, did not, until the most recent generations, sink to the unwarlike, peace-loving, harmless, anarchic, and non-religious standpoint which they have now reached. It ought to be observed, however, that in the Eskimo of Danish Greenland no considerable alteration has been brought about by their all having learned to read and write and profess the Christian religion—although with an indifference to the consequences of original sin, the mysteries of redemption, and the punishments of hell, which all imaginable missionary zeal has not succeeded in overcoming. Their innocent natural state has not been altered in any considerable degree by being

subjected to these conditions of culture. It is certain besides, that the blood which flows in the veins of the Greenlander is not pure Eskimo blood, but is mingled with the blood of some of the proudest martial races in the world. When we consider how



CHUKCH BONE CARVINGS OF BIRDS

Size of the originals.

rapidly, even now, when Greenland is in constant communication with the European mother-country, all descendants of mixed blood become complete Eskimo in language and mode of life, how difficult it often is, even for parents of pure European

descent, to get their children to speak any other language than that of the natives, and how they, on their part, seldom borrow a word from the Europeans, how common mixed marriages and natives of mixed blood are even now—in view of all this it appears to me much more probable that Erik the Red's colonists were quietly and peacefully converted into Eskimo, than that they were killed by the Eskimo. A single century's complete separation from Europe would be sufficient to carry out thoroughly this alteration of the present European population of Greenland, and by the end of that period the traditions of Danish rule would be very obscure in that land. Perhaps some trifling quarrel between a ruler of the colony and a native would take the foremost place among the surviving traditions, and be interpreted as a reminiscence from a war of extermination.

Even the present Chukches form, without doubt, a mixture of several races, formerly savage and warlike, who have been driven by foreign invaders from south to north, where they have adopted a common language, and on whom the food-conditions of the shore of the Polar Sea, the cold, snow, and darkness of the Arctic night, the pure, light atmosphere of the Polar summer, have impressed their ineffaceable stamp, a stamp which meets us with little variation, not only among the people now in question, but also—with the necessary allowance for the changes, not always favourable, caused by constant intercourse with Europeans—among the Lapps of Scandinavia and the Samoyeds of Russia.

It would be of great psychological interest to ascertain whether the change which has taken place in a peaceful direction is progress or decadence. Notwithstanding all the interest which the honesty, peaceableness, and innocent friendliness of the Polar tribes have for us, it is my belief that the answer must be—*decadence*. For it strikes us as if we witness here the conversion of a savage, coarse, and cruel man into a

being, nobler, indeed, but one in whom just those qualities which distinguish man from the animals, and to which at once the great deeds and the crimes of humanity have been due, have been more and more effaced, and who, if special protection or specially favourable circumstances be absent, will not be able to maintain the struggle for existence with new races that may seek to force their way into the country.

CHAPTER XIII.

The development of our knowledge of the north coast of Asia—Herodotus—Strabo—Pliny—Marco Polo—Herberstein's map—The conquest of Siberia by the Russians—Deschnev's voyages—Coast navigation between the Lena and the Kolyma—Accounts of islands in the Polar Sea and old voyages to them—The discovery of Kamchatka—The navigation of the Sea of Okotsk is opened by Swedish prisoners-of-war—The Great Northern Expedition—Behring—Schalaurov—Andreyev's Land—The New Siberian islands—Hedenström's expeditions—Anjou and Wrangel—Voyages from Behring's Straits westward—Fictitious Polar voyages.

Now that the north-eastern promontory of Asia has been at last circumnavigated, and vessels have thus sailed along all the coasts of the old world, I shall, before proceeding farther in my sketch of the voyage of the *Vega*, give a short account of the development of our knowledge of the north coast of Asia.

Already in primitive times the Greeks assumed that all the countries of the earth were surrounded by the ocean. STRABO, in the first century before Christ, after having shown that HOMER favoured this view, brings together in the first chapter of the First Book of his geography reasons in support of it in the following terms:—

"In all directions in which man has penetrated to the uttermost boundary of the earth, he has met the sea, that is, the ocean. He has sailed round the east coast towards India, the west coast towards Iberia and Mauritia, and a great part of the south and north coast. The remaining portion which has not yet been sailed round in consequence of the voyages which have been undertaken from both sides not having been connected, is inconsiderable. For those who have attempted to circumnavi-

gate the earth and have turned, declare that their undertaking did not fail in consequence of their having met with land, but in consequence of want of provisions and of complete timidity .... At sea they could always have gone further. .... This view (that the earth is surrounded by water) also accords better with the phenomena of the tides, for as the ebb and flow are everywhere the same, or at least do not vary much, the cause of this motion is to be sought for in a single ocean." [1]

But if men were thus agreed that the north coast of Asia and Europe was bounded by the sea, there was for sixteen hundred years after the birth of Christ no actual knowledge of the nature of the Asiatic portion of this line of coast. Obscure statements regarding it, however, were current at an early period.

While HERODOTUS, in the forty-fifth chapter of his Fourth Book, expressly says that no man, so far as was then known, had discovered whether the eastern and northern countries of Europe are surrounded by the sea, he gives in the twenty-third and twenty-fourth chapters of the same book the following account of the countries lying to the north-east :—

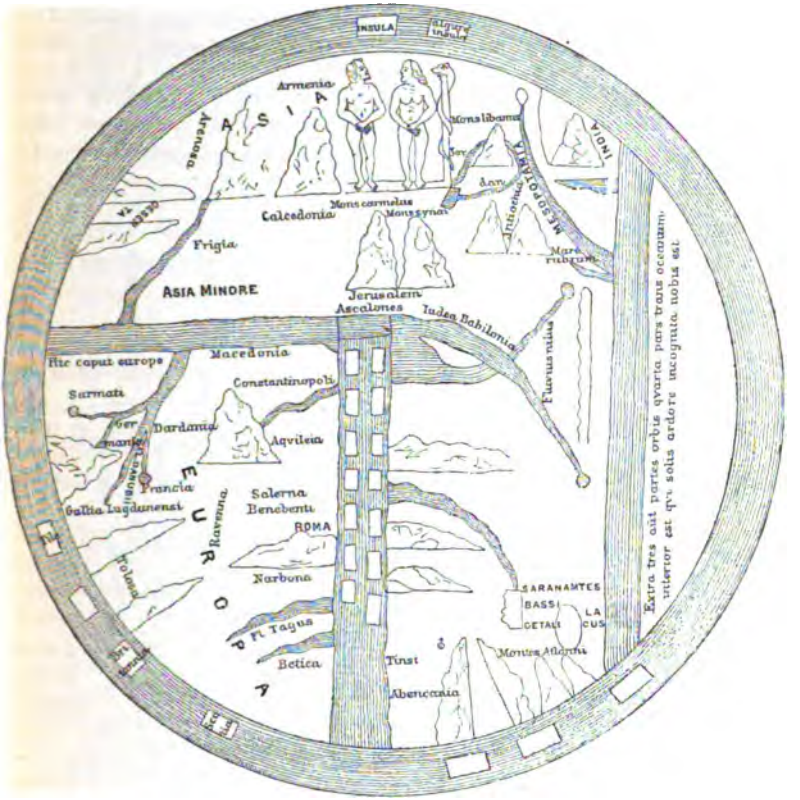
"As far as the territory of the Scythians all the land which we have described is an uninterrupted plain, with cultivable soil, but beyond that the ground is stony and rugged. And on the other side of this extensive stone-bound tract there live at the foot of a high mountain-chain men who are bald from their birth, both men and women; they are also flat-nosed and have large chins. They speak a peculiar language, wear the Scythian dress and live on the fruit of a tree. The tree on which they live is called *Ponticon*, is about as large as the wild fig-tree, and bears fruit which resembles a bean, but has a kernel. When this fruit is ripe, they strain it through a cloth, and the juice which flows from it is thick and black and called *aschy*. This juice they suck or drink mixed with milk, and of the pressed fruits they make cakes which they eat; for they have not many cattle because the pasture is poor.... As far as to these bald people the land is now sufficiently well known, also the

[1] I quote this because the movement of the tides is still, in our own time, made use of to determine whether certain parts of the Polar seas are connected with each other or not.

races on this side of them, because they are visited by Scythians. From them it is not difficult to collect information, which is also to be had from the Greeks at the port of the Borysthenes and other ports in Pontus. The Scythians who travel thither do business with the assistance of seven interpreters in seven languages. So far our knowledge extends. But of the land on the other side of the bald men none can give any trustworthy account because it is shut off by a separating wall of lofty trackless mountains, which no man can cross. But these bald men say—which, however, I do not believe—that men with goat's feet live on the mountains, and on the other side of them other men who sleep six months at a time. The latter statement, however, I cannot at all admit. On the other hand, the land east of the bald men, in which the Issedones live, is well known, but what is farther to the north, both on the other side of the bald men and of the Issedones, is only known by the statements of these tribes. . . . Above the Issedones live the one-eyed men, and the gold-guarding griffins. This information the Scythians have got from the Issedones and we from the Scythians, and we call the one-eyed race by the Scythian name Arimaspi, for in the Scythian language *arima* signifies one and *spou* the eye. The whole of the country which I have been speaking of has so hard and severe a winter, that there prevails there for eight months an altogether insupportable cold, so that if you pour water on the ground you will not make mud, but if you light a fire you will make mud. Even the sea freezes, and the whole Cimmerian Bosphorus, and the Scythians who live within the trench travel on the ice and drive over it in waggons. . . . Again, with reference to the feathers with which the Scythians say the air is filled, and which prevent the whole land lying beyond from being seen or travelled through, I entertain the following opinion. In the upper parts of this country it snows continually, but, as is natural, less in summer than in winter. And whoever has seen snow falling thick near him will know what I mean. For snow resembles feathers, and on account of the winter being so severe the northern parts of this continent cannot be inhabited. I believe then that the Scythians and their neighbours called snow feathers, on account of the resemblance between them. This is what is stated regarding the most remote regions."

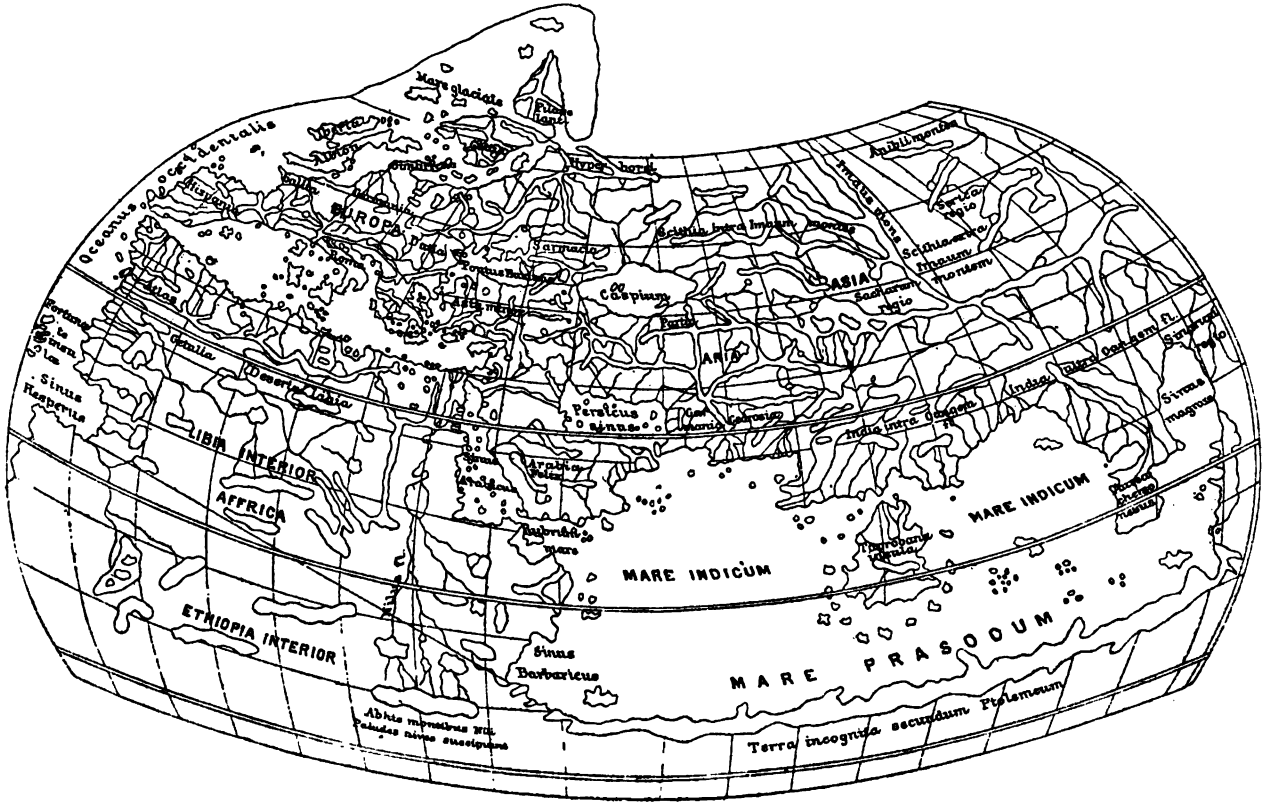
These and other similar statements, nowithstanding the absurdities mixed up with them, are founded in the first instance on the accounts of eye-witnesses, which have passed

from mouth to mouth, from tribe to tribe, before they were noted down. Still several centuries after the time of Herodotus, when the Roman power had reached its highest point, little more was known of the more remote parts of north Asia. While



MAP OF THE WORLD, SAID TO BE OF THE TENTH CENTURY.
Found in a manuscript of the twelfth century in the Library at Turin.
(From Santarem's Atlas.)

Herodotus, in the two hundred and third chapter of his First Book, says that "the Caspian is a sea by itself having no communication with any other sea," Strabo, induced by evidence



MAP OF THE WORLD SHOWING ASIA TO BE CONTINUOUS WITH AFRICA.
(From Nicolai Doni's edition of *Ptolemæi Cosmographia*, Ulm. 1482.)

furnished by the commander of a Greek fleet in that sea, states (Book II. chapters i. and iv.) that the Caspian is a gulf of the Northern Ocean, from which it is possible to sail to India. PLINY THE ELDER (*Historia Naturalis*, Book VI. chapters xiii. and xvii.) states that the north part of Asia is occupied by extensive deserts bounded on the north by the Scythian Sea, that these deserts run out to a headland, *Promontorium Scythicum*, which is uninhabitable on account of snow. Then there is a land inhabited by man-eating Scythians, then deserts, then Scythians again, then deserts with wild animals to a mountain ridge rising out of the sea, which is called *Tabin*. The first people that are known beyond this are the Seri. PTOLEMY and his successors again supposed, though perhaps not ignorant of the old statement that Africa had been circumnavigated under Pharaoh Necho, that the Indian Ocean was an inland sea, everywhere surrounded by land, which united southern Africa with the eastern part of Asia, an idea which was first completely abandoned by the chartographers of the fifteenth century after the circumnavigation of Africa by VASCO DA GAMA.

The knowledge of the geography of north Asia remained at this point until MARCO POLO,[1] in the narrative of his remarkable

[1] Marco Polo, in 1271, at the age of seventeen or eighteen, accompanied his father Nicolo, and his uncle Maffeo Polo, to High Asia. He remained there until 1295, and during that time came into great favour with Kubla Khan, who employed him, among other things, in a great number of important public commissions, whereby he became well acquainted with the widely extended lands which lay under the sceptre of that ruler. After his return home he caused a great sensation by the riches he brought with him, which procured him the name *il Millione*, a name however which, according to others, was an expression of the doubts that were long entertained regarding the truthfulness of his, as we now know, mainly true accounts of the number of the people and the abundance of wealth in Kublai Khan's lands. "Il Millione," in the meantime, became a popular carnival character, whose cue was to relate as many and as wonderful "yarns" as possible, and in his narratives to deal preferably with millions. It is possible that the predecessor of Columbus might have descended to

journeys among the peoples of Middle Asia, gave some information regarding the most northerly lands of this quarter of the world also. The chapters which treat of this subject bear the distinctive titles: "On the land of the Tartars living in the north," "On another region to which merchants only travel in waggons drawn by dogs," and "On the region where darkness prevails" (*De regione tenebrarum*). From the statements in these chapters it follows that hunters and traders already inhabited or wandered about in the present Siberia, and brought thence valuable furs of the black fox, sable, beaver, &c. The northernmost living men were said to be handsome, tall and stout, but very pale for want of the sun. They obeyed no king or chief, but were coarse and uncivilised and lived as beasts.[1] Among the products of the northern countries white bears are mentioned, from which it appears that at that time the hunters had already reached the coast of the Polar Sea. But Marco Polo nowhere says expressly that Asia is bounded on the north by the sea.

All the maps of North Asia which have been published down to the middle of the sixteenth century, are based to a greater or less extent on interpretations of the accounts of Herodotus, Pliny, and Marco Polo. When they do not surround the whole Indian Ocean with land, they give to Asia a much less extent

posterity merely as the original of this character if he had not, soon after his return home, taken part in a war against Genoa, in the course of which he was taken prisoner, and, during his imprisonment, related his recollections of his travels to a fellow-prisoner, who committed them to writing, in what language is still uncertain. The work attracted great attention and was soon spread, first in written copies, then by the press in a large number of different languages. It has not been translated into Swedish, but in the Royal Library in Stockholm there is a very important and hitherto little known manuscript of it from the middle of the fourteenth century, of which an edition is in course of publication in photo-lithographic facsimile.

[1] Homines illius regionis sunt pulchri, magni, et corpulenti, sed sunt multum pallidi . . . . et sunt homines inculti, et immorigerati et bestialiter viventes.

in the north and east than it actually possesses, make the land in this direction completely bounded by sea, and delineate two headlands projecting towards the north from the mainland. To these they give the names *Promontorium Scythicum* and *Tabin*,

MAP OF THE WORLD AFTER FRA MAURO FROM THE MIDDLE OF THE FIFTEENTH CENTURY.

(From Il mappamondo di Fra Mauro Camaldolese descritto ed illustrato da D. Placido Zurla, Venezia, 1806.)

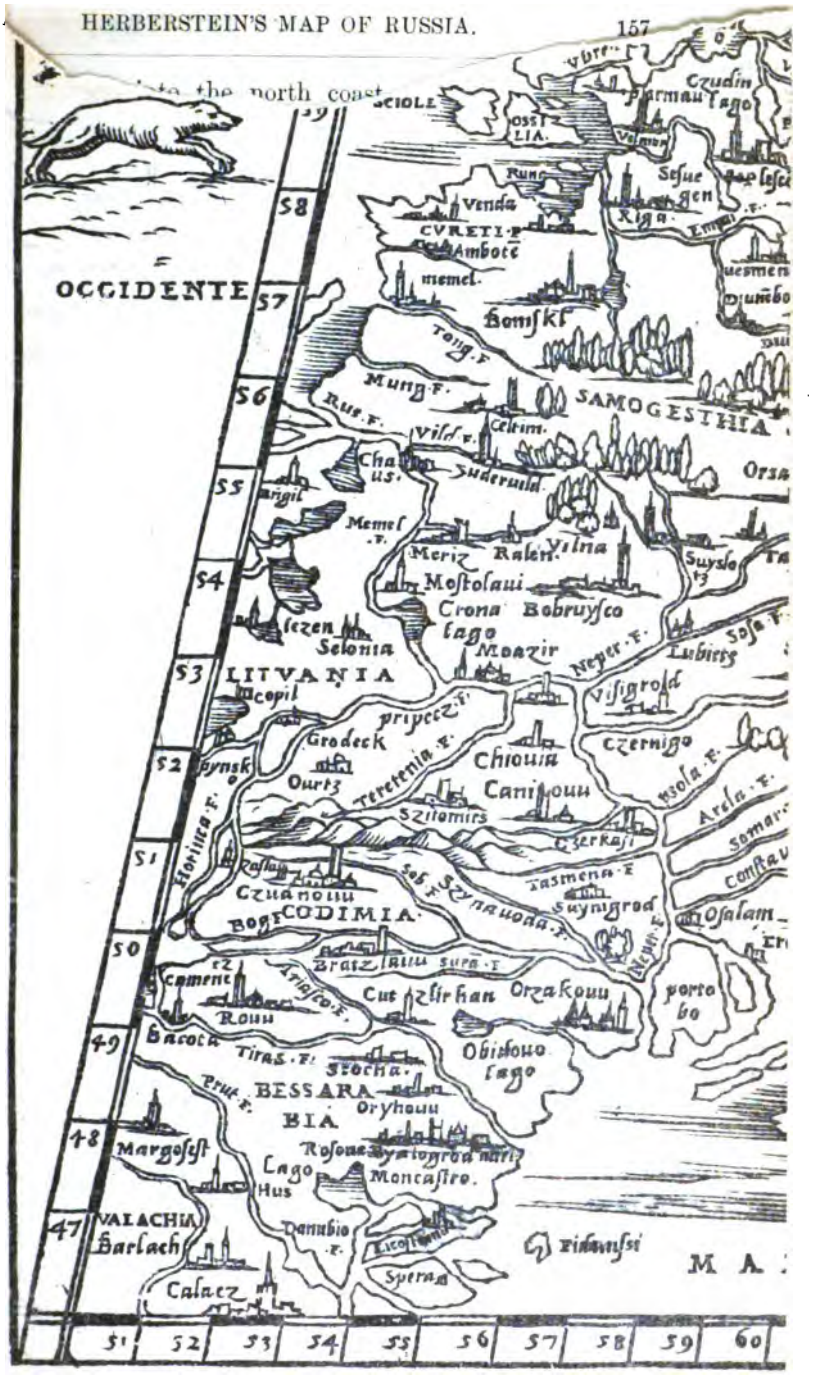
and they besides place in the neighbourhood of the north coast a large island to which they give the name that already occurs in Pliny, *Insula Tazata*, which reminds us, perhaps by an

accidental resemblance of sound, of the name of the river and bay, Tas, between the Ob and the Yenisej. Finally, the borders of the maps are often adorned with pictures of wonderfully formed men, whose dwellings the hunters placed in those regions, the names being at the same time given of a larger or smaller number of peoples and cities mentioned by Marco Polo.

On the whole, the voyages of the Portuguese to India and the Eastern archipelago, the discovery of America and the first circumnavigation of the globe, exerted little influence on the current ideas regarding the geography of North Asia. A new period in respect of our knowledge of this part of the old world first began with the publication of HERBERSTEIN'S *Rerum Moscoviticarum Commentarii*, Vindobonæ 1549.[1] This work has annexed to it a map with the title "Moscovia Sigismundi liberi baronis in Herberstein Neiperg et Gutnhag. Anno MDXLIX. Hanc tabulam absolvit AUG. HIRSFOGEL Viennæ Austriæ cum gra. et privi. imp.,"[2] which indeed embraces only a small part of Siberia, but shows that a knowledge of North Russia now began to be based on actual observations. A large gulf, marked with the name Mare Glaciale (the present White

[1] See note at page 54, vol. i., for an account of von Herberstein and his works.

[2] As the copy of the original map to which I have had access, being coloured, is unsuitable for photo-lithographing, I give here instead a photo-lithographic reproduction of the map in the Italian edition printed in 1550. The map itself is unchanged in any essential particular, but the drawing and engraving are better. There is, besides, a still older map of Russia in the first edition of Sebastian Münster's *Cosmographiæ Universalis*. I have not had access to this edition, but have had to the third edition of the same work printed at Basel in 1550. A very incomplete map of Russia engraved on wood, on which, however, the Obi and the "Sybir" are to be found, is inserted in this work at page 910. The Dwina here falls not into the White Sea but into the Gulf of Finland, through a lake to which the name Ladoga is now given; places like Astracan, Asof, Viborg, Calmahori (Kolmogor), Solowki (Solovets), &c., are indicated pretty correctly, and in the White Sea there is to be seen a very faithful representation of a walrus swimming.


OCCIDENTE
SAMOGESITHIA
LITVANIA
CODIMIA
BESSARA
BIA
VALACHIA
Barlach
Calaez
Margoſſt
Moncaſtro.
Lago
Hus
Danubio
Sperna
Bacoca
Roun
Cut
Orzakoun
Obiſtouo
lago
Chiouia
Czernigo
Canikoun
Oryhouu
Rosone
Vilna
Meriz
Ralen
Moſtolaui
Crona
Bobruyſco
lago
Selonia
Grodeck
Ourtz
Sztlomirs
Czuanoiu
Suyngrod
Smolensk
Orsa
Suyslo
Lubiesz
Visigrod
Czerkasi
Osalam
Venda
Ambote
Memel
Bomſki
Mozir
Neper F.
Duna F.
Boryſthen F.
Tyras F.
Prut F.
Tesetenia F.
Pripecz F.
Rus F.
Mung F.
Tasmena F.
Sosz F.
Arsela F.
Vsola F.
Somar
Comsta
Porto
Ba
Sloboda
Ridanſsi
M A
57
58
59
60
51
52
53
54
55
56
47
48
49
50

MAP OF RUSSI

Sea) here projects into the north coast of Russia; from the south there falls into it a large river, called the Dwina. On the banks of the Dwina there are forts or towns with the names Solovoka (Solovets), Pinega, Colmogor, &c. There are to be found on the map besides, the names Mesen, Peczora, Oby,[1] Tumen, &c. Oby runs out of a large lake named Kythay lacus. In the text, mention is made of Irtisch and Papingorod, of walruses and white bears[2] by the coast of the Polar Sea, of the Siberian cedar-tree, of the word Samoyed signifying self-eaters, &c.[3] The walrus is described in great detail. It is mentioned further that the Russian Grand Duke sent out two men, SIMEON THEODOROVITSCH KURBSKI and Knes PIETRO UCHATOI, to explore the lands east of the Petchora, &c.

Herberstein's work, where the narrative of Istoma's circumnavigation of the northern extremity of Europe, which has been already quoted, is to be found, was published only a few years before the first north-east voyages of the English and the Dutch, of which I have before given a detailed account. Through these the northernmost part of European Russia and the westernmost part of the Asiatic Polar Sea were mapped, but an actual knowledge of the north coast of Asia in its entirety was obtained through the conquest of Siberia by the Russians. It is impossible here to give an account of the campaigns, by which the whole of this enormous territory was brought under the sceptre of the Czar of Moscow, or of the private journeys for sport, trade, and the collecting of tribute, by which this conquest was facilitated. But as nearly every step which the Russian

[1] The river Ob is mentioned the first time in 1492, in the negotiations which the Austrian ambassador, Michael Snups, carried on in Moscow in order to obtain permission to travel in the interior of Russia (Adelung, *Uebersicht der Reisenden in Russland*, p. 157).

[2] As before stated, Marco Polo mentions Polar bears but not walruses.

[3] Herodotus places Andropagi in nearly the same regions which are now inhabited by the Samoyeds. Pliny also speaks of man-eating Scythians,

invaders took forward, also extended the knowledge of regions previously quite unknown. I shall mention the years in which during this conquest the most important occurrences in a geographical point of view took place, and give a rather more detailed account of the exploratory or military expeditions which led directly to important results affecting the extension of our knowledge of the geography of the region now in question.

The way was prepared for the conquest of Siberia through peaceful commercial treaties[1] which a rich Russian peasant ANIKA, ancestor of the STROGANOV family, entered into with the wild races settled in Western Siberia, whom he even partially induced to pay a yearly tribute to the Czar of Moscow. In connection with this he and his sons in the middle of the sixteenth century obtained large grants of land on the rivers Kama and Chusovaja and their tributaries, with the right to build towns and forts there, whereby their riches, previously very considerable, were much increased. The family's extensive possessions, however, were threatened in 1577 by a great danger, when a host of Cossack freebooters six to seven thousand strong, under the leadership of YERMAK TIMOFEJEV took flight to the country round Chusovaja in order to avoid the troops which the Czar sent to subdue them and punish them for all the depredations they had committed on the Don, the Caspian Sea and the Volga. In order to get rid of the freebooters, MAXIM STROGANOV, Anika's grandson, probably provided Yermak and his men with

[1] [illegible] of the first [illegible] Samojeden [illegible] Wt [illegible] 1612; [illegible] by Fre- [illegible] more correctly, [illegible] Isak Massa's [illegible] the Kara peninsula and the [illegible]

the necessary sustenance, but supported in every way the bold adventurer's plan of entering on a campaign for the conquest of Siberia. This was begun in 1579. In 1580 Yermak passed the Ural, and after several engagements marched in particular against the Tartars living in Western Siberia, along the rivers Tagil and Tura to Tjumen, and thence in 1581 farther along the Tobol and Irtisch to Kutschum Khan's residence Sibir, situated in the neighbourhood of the present Tobolsk. It was this fortress, long since destroyed, which gave its name to the whole north part of Asia.

From this point the Russians, mainly following the great rivers, and passing from one river territory to another at the places where the tributaries almost met, spread out rapidly in all directions. Yermak himself indeed was drowned on the $\frac{18}{6}$th August, 1584, in the river Irtisch, but the adventurers who accompanied him overran in a few decades the whole of the enormous territory lying north of the deserts of Central Asia from Ural to the Pacific, everywhere strengthening their dominion by building *Ostrogs*, or small fortresses, at suitable places. It was the noble fur-yielding animals of the extensive forests of Siberia which played the same part with the Russian *promyschleni*, as gold with the Spanish adventurers in South America.

At the close of the sixteenth century the Cossacks had already possessed themselves of the greater part of the river territory of the Irtisch-Ob, and sable-hunters had already gone as far north-east[1] as the river Tas, where the sable-hunting

[1] It is a peculiar circumstance that the vanguard of the Russian stream of emigration which spread over Siberia, advanced along the northernmost part of the country by the Tas, Turuchansk, Yakutsk, Kolyma, and Anadyrsk. This depended in the first place upon the races living there having less power of resistance against the invaders, who were often very few in number, than the tribes in the south, but also on the fact that the most precious and most transportable treasures of Siberia—sable, beaver, and fox-skins—were obtained in greatest quantity from these northern regions.

was at one time very productive and occasioned the founding of a town, Mangasej, which however was soon abandoned. In 1610 the Russian fur-hunters went from the river territory of the Tas to the Yenisej, where the town Turuchansk was soon after founded on the Turuchan, a tributary of the Yenisej. The attempt to row down in boats from this point to the Polar Sea, with the view of penetrating farther along the sea coast, failed in consequence of ice obstacles, but led to the discovery of the river Pjäsina and to the levying of tribute from the Samoyeds living there. To get farther eastward the tributaries of the Yenisej were made use of instead of the sea route. Following these the Russians on the upper course of the Tunguska met with the mountain ridge which separates the river territory of the Yenisej from that of the Lena. This ridge was crossed, and on the other side of it a new stream was met with, which in the year 1627 led the adventurers to the Lena, over whose river territory the Cossacks and fur-hunters, faithful to their customs, immediately spread themselves in order to hunt, purchase furs, and above all to impose "jassak" upon the tribes living thereabouts. But they were not satisfied with this. Already in 1636 the Cossack ELISEJ BUSA was sent out with an express commission to explore the rivers beyond, falling into the Polar Sea, and to render tributary the natives living on their banks. He was accompanied by ten Cossacks, to whose company forty fur-hunters afterwards attached themselves. In 1637 he came to the western mouth-arm of the Lena, from which he went along the coast to the river Olenek, where he passed the winter. Next year he returned by land to the Lena, and built there two "kotsches,"[1] in which he descended the

[1] Flat-bottomed, half-decked boats, twelve fathoms in length. The planks were fastened by wooden pins, the anchors were pieces of wood with large stones bound to them, the rigging of thongs, and the sails often of tanned reindeer hides (J. E. Fischer, *Sibirische Geschichte*, St. Petersburg, 1768, i. p. 517).

river to the Polar Sea. After five days' successful rowing along the coast to the eastward he discovered the mouth of the Yana. After three days' march up the river he fell in with a Yakut tribe, from whom he got a rich booty of sable and other furs. Here he passed the winter of 1638-39, here too he built himself a new craft, and again starting for the Polar Sea, he came to another river falling into the eastern mouth-arm of the Yana, where he found a Yukagir tribe, living in earth huts, with whom he passed two years more, collecting tribute from the tribes living in the neighbourhood.

At the same time IVANOV POSTNIK discovered by land the river Indigirka. As usual, tribute was collected from the neighbouring Yukagir tribes, yet not without fights, in which the natives at first directed their weapons against the horses the Cossacks had along with them, thinking that the horses were more dangerous than the men. They had not seen horses before. A *simovie* was established, at which sixteen Cossacks were left behind. They built boats, sailed down the river to the Polar Sea to collect tribute, and discovered the river Alasej.

Some years after the river Kolyma appears to have been discovered, and in 1644 the Cossack, MICHAILO STADUCHIN, founded on that river a *simovie*, which afterwards increased to a small town, Nischni Kolymsk. Here Staduchin got three pieces of information which exerted considerable influence on later exploratory expeditions, for he acquired knowledge of the Chukches, at that time a military race, who possessed the part of North Asia which lay a little further to the east. Further, the natives and the Russian hunters, who swarmed in the region before Staduchin, informed him that in the Polar Sea off the mouths of the Yana and the Indigirka there was a large island, which in clear weather could be seen from land, and which the Chukches reached in winter with reindeer sledges in one day from Chukotska, a river debouching in the Polar Sea

east of the Kolyma. They brought home walrus tusks from the island, which was of considerable size, and the hunters supposed "that it was a continuation of Novaya Zemlya, which is visited by people from Mesen." Wrangel is of opinion that this account refers to no other than Krestovski Island, one of the Bear Islands. This, however, appears to me to be improbable. It is much more likely that it refers partly to the New Siberian Islands, partly to Wrangel Land, and perhaps even to America. That the Russians themselves had not then discovered Ljachoff's, or as it was then also called, Blischni Island, which lies so near the mainland, and is so high that it is impossible to avoid seeing it when one in clear weather sails past Svjatoinos, which lies east of the Yana, is a proof that at that time they had not sailed along the coast between the mouths of the Yana and the Indigirka. Finally, a great river, the Pogytscha, was spoken of, which could be reached in three or four days' sailing eastward from the mouth of the Kolyma. This was the first account which reached the conquerors of Siberia of the great river Anadyr which falls into the Pacific.

These acccounts were sufficient to incite the Cossacks and hunters to new expeditions. The beginning was made by ISAI IGNATIEV from Mesen, who, along with several hunters, travelled down the Kolyma in 1646 to the Polar Sea, and then along the coast eastwards. The sea was full of ice, but next the land there was an open channel, in which the explorers sailed two days. They then came to a bay, near whose shore they anchored. Here the Russians had their first meeting with the Chukches, to which reference has already been made. Hence Ignatiev returned to the Kolyma; and the booty was considered so rich and his account of his journey so promising, that preparations were immediately made in order next year to send off a new maritime expedition fitted out on a larger scale to the coast of the Polar Sea.

This time FEODOT ALEXEJEV from Kolmogor was chief of

the expedition, but along with him was sent, at the request of the hunters, a Cossack in the Russian service in order to guard the rights of the crown. His name was SIMEON IVANOV SIN DESCHNEV; in geographical writings he is commonly known under the name of DESCHNEV. It was intended to search for the mouth of the great river lying towards the east, regarding which some information had been obtained from the natives, and which was believed to fall into the Polar Sea. The first voyage in 1647, with four vessels, was unsuccessful, it is said, because the sea was blocked with ice. But that this was not the real reason is shown by the fact that a new and larger expedition was fitted out the following year with full expectation of success. The crews of the four boats had more probably been considered too weak a force to venture among the Chukches, and the ice had to bear the blame of the retreat. What man could not reproach the conquerors of Siberia with, was pusillanimity and want of perseverance in carrying out a plan which had once been sketched. Resistance always increased their power of action; so also now. Seven boats were fitted out the following year, 1648, all which were to sail down to the Polar Sea, and then along the coast eastwards. The object was to examine closely the unknown land and people there, and to their own advantage and the extension of the Russian power, to collect tribute from the tribes met with during the expedition. Müller states that every boat was manned with about thirty men—a number which appears to me somewhat exaggerated, if we consider the nature of the Siberian craft and the difficulty of feeding so large a number either with provisions carried along with them or obtained by hunting.

Four of the boats are not mentioned further in the narrative; they appear to have returned at an early period. The three others, on the contrary, made a highly remarkable journey. The commanders of them were the Cossacks, GERASIM

ANKUDINOV and SIMEON DESCHNEV, and the hunter FEODOT ALEXEJEV. Deschnev entertained such hopes of success that before his departure he promised to collect a tribute of seven times forty sable skins. The Siberian archives, according to Müller, contain the following details.[1]

On $\frac{20}{20}$th June, 1648, a start was made from the Kolyma. The sea was open; at least the boats came without any adventure which Deschnev thought worth the trouble of noting in his narrative to Great Chukotskojnos. Of this cape Deschnev says that it is quite different from the cape at the river Chukotskaja. For it lies between north and north-east, and bends with a rounding towards the Anadyr. On the Russian side a rivulet runs into the sea, at which the Chukches had raised a heap of whales' bones. Right off the cape lie two islands, on which people of Chukch race with perforated lips were seen. From this cape it is possible with a favourable wind to sail to the Anadyr in three days, and the way is not longer by land, because the Anadyr falls into a gulf of the sea. At Chukotskojnos or, according to Wrangel at a "holy promontory," Svjatoinos (Serdze Kamen?) previously reached, Ankudinov's craft was shipwrecked. The crew were saved, and distributed on Deschnev's and Alexejev's boats. On the $\frac{20}{20}$th September the Russians had a fight with the Chukches

[1] G. P. Müller, *Sammlung Russischer Geschichte*, St. Petersburg, 1758. Müller asserts in this work that it was he who, in 1736, first drew from the repositories of the Yakutsk archives the account of Deschnev's voyage, which before that time was known neither at the court of the Czar nor in the remotest parts of Siberia. This, however, is not quite correct, for long before Müller, the Swedish prisoner-of-war, Strahlenberg, knew that the Russians travelled by sea from the Kolyma to Kamchatka, which appears from his map of Asia, constructed during his stay in Siberia, and published in *Das Nord- und Ostliche Theil von Europa und Asia*, Stockholm, 1730. On this map there is the following inscription in the sea north of the Kolyma:—"Hic Rutheni ab initio per Moles glaciales, quæ flante Borea ad Littora, flanteque Austro versus Mare iterum pulsantur, magno Labore et Vitæ Discrimine transvecti sunt ad Regionem Kamtszatkam."

living on the coast, in which fight Alexejev was wounded. Soon after Deschnev's and Alexejev's "kotsches" were parted never to meet again.

Deschnev was driven about by storms and head-winds until past the beginning of October. Finally his vessel stranded near the mouth of the river Olutorsk, in 61° N.L. Hence he marched with his twenty-five men to the Anadyr. He had expected to meet with some natives in its lower course, but the region was uninhabited, which caused the invaders much trouble, because they suffered from want of provisions. Although Deschnev could not obtain from the natives any augmentation of the certainly very small supply of food which he carried with him, he succeeded nevertheless in passing the winter in that region. First in the course of the following summer did he fall in with natives, from whom a large tribute was collected, but not without fierce conflicts. A *simovie* was built at the place where afterwards Anadyrski Ostrog was founded. While Deschnev remained here, at a loss as to how, when the boats were broken up, he would be able to return to the Kolyma, or find a way thither by land, there came suddenly on the $\frac{8\text{th May.}}{28\text{th April.}}$ 1650, a new party of hunters to his winter hut.

For the accounts of islands in the Polar Sea, and of the river Pogytscha, which was said to fall into the sea three or four days' journey beyond the Kolyma, had led to the sending out of another expedition under the Cossack STADUCHIN. He started from Yakutsk in boats on the $\frac{15}{5}$th June, 1647, wintered on the Yana, travelled thence in sledges to Indigirka, and there again built boats in which he rowed to the Kolyma. It is to be observed that Staduchin, just because he preferred the land-route to the sea-route between the Yana and the Indigirka, missed discovering the large island in the Polar Sea, of which so much has been said. Next summer (1649) Staduchin again sailed down the river Kolyma to the sea, and then for seven days along its coast eastwards, without finding the mouth of the river sought for

by him. He therefore returned with his object unaccomplished, carrying with him a heap of walrus-tusks, which were sent to Yakutsk as an appendix to a proposal to send out hunters to the Polar Sea to hunt for these animals. In the meantime a true idea of the course of the Anadyr had been obtained through statements collected from the natives, and a land-route had become known between its territory and that of the Kolyma. Several Cossacks and hunters now petitioned for the right to settle on the Anadyr, and collect tribute from the tribes in that neighbourhood. This was granted. Some natives were forced to act as guides. The party started under the command of SIMEON MOTORA, and came finally to Deschnev's *simovie* on the Anadyr. Staduchin followed, and traversed the way in seven weeks. He however soon quarrelled with Deschnev and Motora, and parting from them on that account, betook himself to the river Penschina. Deschnev and Motora built themselves boats on the Anadyr in order to prosecute exploratory voyages, but the latter was killed in 1651 in a fight with natives called Anauls. They had been the first of all the natives of the Pacific coast of North Asia to pay "jassak" to Deschnev, and he had already at that time come into collision with them and extirpated one of their tribes.

In 1652 Deschnev travelled down the Anadyr to the river mouth, where he discovered a walrus-bank, whence he brought home walrus-tusks. There afterwards arose a dispute between Deschnev and Selivestrov[1] regarding the rights founded on the discovery of this walrus bank, which came before the authorities at Yakutsk, and it was from the documents relating to it that Müller obtained the information that enabled him to give a narrative of Deschnev's expedition. Only in this way have

[1] Selivestrov had accompanied Staduchin during his Polar Sea voyage, and had, at his instance, been sent out to collect walrus-tusks on account of the State. He appears to have come to the Anadyr by land.

the particulars of this remarkable voyage been rescued from complete oblivion.[1]

In 1653 Deschnev gave orders to collect wood to build craft in which he intended to carry home by sea the tribute he had collected to the Kolyma, but he was compelled to desist from want of the necessary materials for the building and equipment of the boats, comforting himself with the statement of the natives that the sea was not always so open as during his first voyage. Compelled by necessity, he remained a year longer at the Anadyr, and in 1654 undertook a new hunting voyage to the walrus-bank, where he met with the beforementioned Selivestrov. He here came in contact with the natives (Koryäks), and found among them a Yakut woman, who had belonged to Ankudinov. On asking her where her master had gone to, she answered that Feodot and Gerasim (Ankudinov) had died of scurvy, and that their companions had been killed with the exception of some few, who had saved themselves in boats. It appears as if the latter had penetrated along the coast as far as to the river Kamchatka. For when Kamchatka was conquered by Atlassov in 1697 the natives stated that a long time before one FEODOTOV (probably a son of Feodot Alexejev) had lived among them along with some companions, and had married their women. They were venerated almost as gods. They were believed to be invulnerable until they struck another, when the Kamchadals saw their mistake and killed them.[2]

By the expeditions of Deschnev, Staduchin, and their

[1] Strahlenberg must have collected the main details of this voyage by oral communications from Russian hunters and traders.

[2] According to Müller. Krascheninnikov (*Histoire et description du Kamtschatka*, Amsterdam, 1770, ii. p. 292) states, evidently from information obtained in Kamchatka, that the river Nikul is called Feodotovchina after Feodot Alexejev, who not only penetrated thither, but also sailed round the southern promontory of Kamchatka to the River Tigil where he and his followers perished in the way described by Müller.

companions, the Russians had by degrees become acquainted with the course of the Anadyr and with the tribes living on its banks. But it still remained for them to acquire a more complete knowledge of the islands which were said to be situated in the Polar Sea, and one must be surprised at the extreme difficulties which were encountered in attempting the solution of this apparently very simple geographical problem. The reason indeed was that the Siberian seamen never ventured to leave the immediate neighbourhood of the coast, a precaution which besides is very easily explained when the bad construction of their craft is considered. Along the shore of the Polar Sea on the other hand, a very active communication appears to have taken place between the Lena and the Kolyma, though of those voyages we only know such as in one way or another gave rise to actions before the courts or were characterised by specially remarkable dangers or losses.

In 1650 ANDREJ GORELOJ was sent by sea from Yakutsk to impose tribute on the tribes that lived at the sources of the Indigirka, and on the Moma, a tributary of the Indigirka. He passed Svjatoinos successfully, and reached the mouth of the Kroma, but was there beset by ice, with which he drifted out to sea. After drifting about ten days he was compelled to abandon the vessel, which was soon after nipped, and go on foot over the ice to land. On the $\frac{22\text{nd}}{12\text{th}}$ November he came to the *simovie* Ujandino, where famine prevailed during the winter, *because the vessels, that should have brought provisions to the place, had either been lost or been compelled to turn;* a statement which proves that at that time a regular navigation took place between certain parts of the coast of the Polar Sea.

The same year, the Cossack, TIMOFEJ BULDAKOV travelled by sea from the Lena to the Kolyma to take over the command of the neighbouring region. He reached the Kroma successfully, but was beset there and drifted out to sea. He then

determined to endeavour to get to land over the ice. But this was no easy matter. The ice, which already was three feet thick, went suddenly into a thousand pieces, while the vessel drove before a furious gale farther and farther from the shore. This was repeated several times. When the sea at last froze over, the vessel was abandoned, and the party finally succeeded, worn out as they were by hunger, scurvy, work, and cold, in reaching land at the mouth of the Indigirka. The narrative of Buldakov's voyage is, besides, exceedingly remarkable, because a meeting is there spoken of with twelve "kotsches," filled with Cossacks, traders, and hunters, bound partly from the Lena to the rivers lying to the eastward, partly from the Kolyma and Indigirka to the Lena, a circumstance which shows how active the communication then was in the part of the Siberian Polar Sea in question. This is further confirmed by a narrative of NIKIFOR MALGIN. While Knes IVAN PETROVITSCH BARJATINSKY was *vojvode* at Yakutsk (1667-75), Malgin travelled along with a trader, ANDREJ WORIPAJEV, by sea from the Lena to the Kolyma. During this voyage the pilot directed the attention of all on board to an island, lying far out at sea, west of the mouth of the Kolyma. In course of a conversation regarding it, after Malgin had succeeded in reaching the Kolyma, another trader, JAKOB WIÄTKA, stated that on one occasion when he was sailing with nine "kotsches" between the Lena and the Kolyma, three of them had been driven by wind to this island, and that the men who had been sent ashore there, found traces of unknown animals, but no inhabitants.

All these narratives, however, do not appear to have met with full credence. In the beginning of the eighteenth century, accordingly, new explorations and new expeditions were undertaken. A Cossack, JAKOB PERMAKOV, stated that during a voyage between the Lena and the Kolyma, he had seen off Svjatoinos an island, of which he knew not whether it was inhabited or not, and likewise, that off the mouth of the Kolyma

there was an island which could be seen from land. In order to make sure of the correctness of this statement, a Cossack, MERCUREJ WAGIN, was sent out. He travelled along with Permakov, in the month of May, in dog-sledges over the ice from Svjatoinos to the island lying off it, that Permakov had seen. They landed there, found it uninhabited and treeless, and fixed its circumference at nine to twelve days' journey. Beyond this island Wagin saw another, which, however, he could not reach for want of provisions. He therefore determined to turn, in order to undertake the journey the following year in a better state of preparation. During the return journey the party suffered severely from hunger, and in order to avoid a renewal of the dangerous and difficult journey of exploration, the men at last murdered Permakov, Wagin, and his son. The crime was discovered, and the knowledge we possess of this expedition is founded on the confused information obtained during the examination of the murderers. Müller even throws doubts on the truth of the whole narrative.

The attempts which were afterwards made to reach those islands, partly by sea in 1712, by WASILEJ STADUCHIN, partly by dog-sledges in 1714 by ALEXEJ MARKOV and GRIGOREJ KUSAKOV, yielded no result. Ten years afterwards, "the old saga" of the islands in the Polar Sea, induced one SIN BAJORSKI FEODOT AMOSSOV to undertake an expedition with a view to impose tribute on their inhabitants, but he was prevented by ice from reaching his goal. On the way he met with a hunter, IVAN WILLEGIN, who said, that along with another hunter, GRIGOREJ SANKIN, he had travelled over the ice to these islands from the mouth of the river Chukotskaja. He had seen neither men nor trees, but some abandoned huts. "Probably this land extends all the way from the mouth of the Yana, past the Indigirka and Kolyma to the region which is inhabited by the Schelags, a Chukch tribe." He had learned this from a Schelag named Kopai, at whose home he had been the preceding year. In

order to reach this land by sea it was necessary to start from the coast which the Schelags inhabited, because the sea was less covered by ice there.

As Amossov could not reach his goal by sea he travelled thither the same year, in November, 1724, over the ice, but his description of the land differs widely from that of his predecessor, and Müller appears to entertain great doubts of the truthfulness of the narrative.[1] On the ground of a map constructed by the Cossack, Colonel SCHESTAKOV, who, however, according to Müller, could neither read nor write, this new land was introduced into DELISLE and BUACHE'S map, with the addition that the Schelag Kopai lived there, and had there been taken prisoner by the Russians. This is so far incorrect, as Kopai did not live on any island, but on the mainland, and never was prisoner with the Russians, although after having paid tribute to them, he tired of doing so, and killed some of Amossov's people, after which no more was heard of him. Müller complains loudly of the incorrect statement regarding Kopai, but the learned academician commits a much greater mistake, inasmuch as he considers that he ought to leave the numerous accounts of hunters and Cossacks about land and islands in the Siberian Polar Sea completely out of account. All these lands are therefore left out of the map published by the Petersburg Academy in the year 1758.[2] It is in this respect much more

[1] But we ought to remember that the oldest accounts of islands in the Polar Sea relate to no fewer than four different lands, viz., 1. The New Siberian Islands lying off the mouth of the Lena and Svjatoinos; 2. The Bear Islands; 3. Wrangel Land; 4. The north-western part of America. Contradictions in accounts of the islands in the Polar Sea probably depend on the uninhabited and treeless New Siberian islands being confused with America, which, in comparison with North Siberia, is thickly peopled and well wooded, with the small Bear Islands, with Wrangel Land, &c.

[2] *Nouvelle carte des découvertes faites par des vaisseaux russiens aux côtes inconnues de l'Amérique Septentrionale avec les pais adiacentes, dressée sur des mémoires authentiques des ceux qui ont assisté à ces découvertes*

incomplete than the map which accompanies Strahlenberg's book.[1]

Before I begin to sketch the explorations of the great northern expedition, some account remains to be given of the discovery of Kamchatka. It appears from the preceding that Kamchatka was already reached by some of Deschnev's followers, but their important discovery was completely unknown in Moscow. Kamchatka is, however, already mentioned in the narrative of Evert Ysbrants Ides' embassy to China in 1693-95;[2] accounts of it had probably been obtained from the Siberian natives, who are accustomed to wander far and near. These accounts, however, are exceedingly incomplete, and therefore, VOLODOMIR ATLASSOV, *piātidesātnik* (*i.e.*, commander of fifty men) at Anadyrsk, is considered the proper discoverer of Kamchatka.

While Atlassov was commander at Anadyrsk, he sent out in 1696, the Cossack LUCAS SEMENOV SIN MOROSKO with sixteen men to bring the tribe living to the south under tribute. The commission was executed, and on his return Morosko stated that he not only was among the Koryäks, but had also penetrated to the neighbourhood of the river Kamchatka, and that he took a Kamchadal "ostrog," and found in it some manuscripts in an unknown language, which, according to information afterwards obtained, had belonged to some Japanese who had stranded on the coast of Kamchatka.[3] It was the first hint the conquerors

et sur d'autres connoissances dont on rend raison dans un mémoire separé. St. Petersbourg, l'Académie Impériale des Sciences, 1758.

[1] In this sketch of the discovery and conquest of Siberia I have followed J. E. Fischer, *Sibirische Geschichte*, St. Petersburg, 1768, and G. P. Müller, *Sammlung Russischer Geschichte*, St. Petersburg, 1758.

[2] In the twentieth chapter of *Dreyjährige Reise nach China*, &c., Frankfort, 1707. The first edition came out at Hamburg in 1698.

[3] Müller, iii. p. 19. An account of Atlassov's conquest of Kamchatka (*Bericht gedaen door zeker Moskovisch krygs-bediende Wolodimer Otlasofd, hooft-man over vyftig*, &c.) is besides to be found in Witsen (1705, *Nieuwe*

of Siberia obtained of their being in the neighbourhood of Japan.

The year after Atlassov, with a larger force, followed the way which Morosko had opened up, and penetrated to the river Kamchatka, where as a sign that he had taken possession of the land, he erected a cross with an inscription, which when translated runs thus: *In the year* 7205 (i.e. 1697) *on the* 13*th July this cross was erected by the piätidesätnik Volodomir Atlassov and his followers,* 55 *men.* Atlassov then built on the Kamchatka river a *simovie,* which was afterwards fortified and named Verchni Kamtschatskoj Ostrog. Hence the Russians extended their power over the land, yet not without resistance, which was first completely broken by the cruel suppression of the rebellion of 1730.

In 1700 Atlassov travelled to Moscow, carrying with him a Japanese, who had been taken prisoner after being shipwrecked on the coast of Kamchatka, and the collected tribute which consisted of the skins of 3,200 sables, 10 sea-otters, 7 beavers, 4 otters, 10 grey foxes and 191 red foxes. He was received graciously, and sent back as commander of the Cossacks in Yakutsk with orders to complete the conquest of Kamchatka. An interruption however happened for some time in the path of Atlassov as a warrior and discoverer, in consequence of his having during his return journey to Yakutsk plundered a Russian vessel laden with Chinese goods, an accessory circumstance which deserves to be mentioned for the light which it throws on the character of this Pizarro of Kamchatka. He was not set free until the year 1706, and then recovered his

uitguaf, 1785, p. 670). An account, written from oral communication by Atlassov himself, is to be found inserted in Strahlenberg's *Travels*, p. 431. Strahlenberg considers Kamchatka and Yezo to be the same land. A history of the conquest of Kamchatka, evidently written according to traditions current in the country, is to be found in *Krascheninnikov* (French edition of 1770, ii. p. 291). In this account 1698 and 1699 are given as the years of Morosko's and Atlassov's expeditions.

command in Kamchatka, with strict orders to desist from all arbitrary proceedings and acts of violence, and to do his best for the discovery of new lands. The first part of this order he however complied with only to a limited extent, which gave occasion to repeated complaints[1] and revolts among the already unbridled Cossacks. Finally, in 1711, Atlassov and several other officers were murdered by their own countrymen. In order to atone for this crime, and perhaps to get a little farther from the arm of justice, their murderers, ANZIPHOROV and IVAN KOSIREVSKOJ,[2] undertook to subdue the not yet conquered part of Kamchatka, and the two northernmost of the Kurile Islands. Further information about the countries lying farther south was obtained from some Japanese who were shipwrecked in 1710 on Kamchatka.

At first in order to get to Kamchatka the difficult detour by Anadyrsk was taken. But in the year 1711 the commander at Okotsk, SIN BOJARSKI PETER GUTUROV, was ordered, by the energetic promoter of exploratory expeditions in Eastern Siberia, the Yakutsk *voivode*, DOROFEJ TRAUERNICHT, to proceed by sea from Okotsk to Kamchatka. But this voyage could not come

[1] Complaints were made, among other things, that in order to obtain metal for making a still, he ordered all the copper belonging to the crown which he carried with him, to be melted down. When the Cossacks first came to Kamchatka and were, almost without a contest, acknowledged as masters of the country, they found life there singularly agreeable, with one drawback—there were no means of getting drunk. Finally, necessity compelled the wild adventurers to betake themselves to what we should now call chemico-technical experiments, which are described in considerable detail by Krascheninnikov (*loc. cit.* ii. p. 369). After many failures they finally succeeded in distilling spirits from a sugar-bearing plant growing in the country, and from that time this drink, or *raka*, as they themselves call it, has been found in great abundance in that country.

[2] He afterwards became a monk under the name of Ignatiev, came to St. Petersburg in 1730, and himself wrote a narrative of his adventures, discoveries, and services, which was printed first in the St. Petersburg journals of the 26th March, 1730, and likewise abroad (*Müller*, iii. p. 82).

off because at that time there were at Okotsk neither seagoing boats, seamen, nor even men accustomed to the use of the compass. Some years after the governor Prince GAGARIN sent to that town IVAN SOROKAUMOV with twelve Cossacks to make arrangements for this voyage. For want of ships and seamen however, this could not now be undertaken, and after Sorokaumov had created great confusion he was imprisoned by the authorities of the place, and sent back to the Governor. Peter I. now commanded *that men acquainted with navigation should be sought for among the Swedish prisoners of war and sent to Okotsk; that they should build a boat there and, provided with a compass, go by sea along with some Cossacks to Kamchatka and return.*[1] Thus navigation began on the Sea of Okotsk. Among the Swedes who opened it, is mentioned HENRY BUSCH,[2] according to Strahlenberg a Swedish corporal, who had previously been a ship-carpenter. According to Müller, who met with him at Yakutsk as late as 1736, he was born at Hoorn in Holland, had served at several places as a seaman, and finally among the Swedes as a trooper, until he was taken prisoner at Viborg in 1706. He gave Müller the following account of his first voyage across the Sea of Okotsk.

After arriving at Okotsk they had built a vessel, resembling the *lodjas* used at Archangel and Mesen for sailing on the White Sea and to Novaya Zemlya. The vessel was strong; its length was eight and a half fathoms, its breadth three fathoms, the

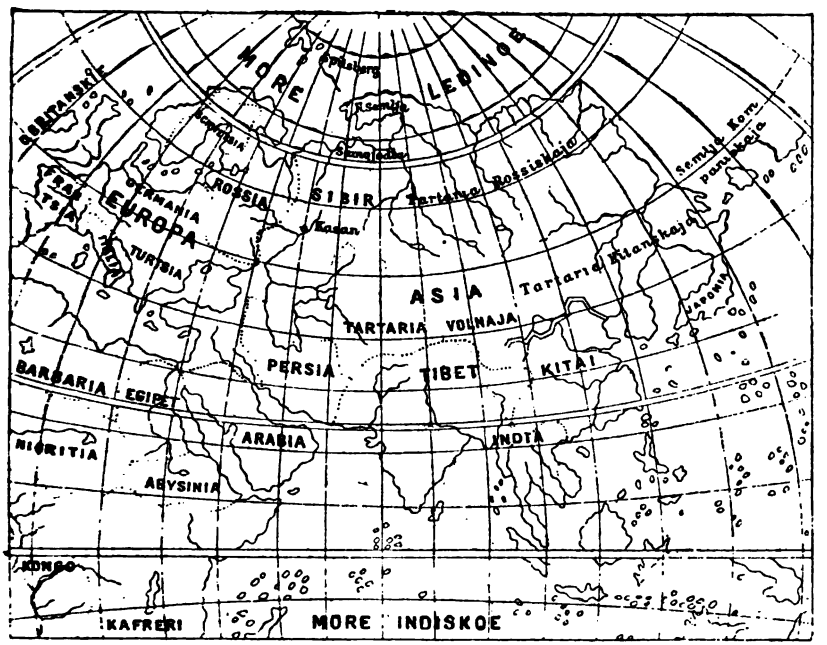
[1] Von Baer, *Beiträge zur Kentniss des Russischen Reiches*, xvi. p. 33.

[2] Anbjörn Molin, lieutenant in the Scanian cavalry regiment, who was taken prisoner at the Dnieper in 1709, also took part in these journeys. Compare *Berättelse om de i Stora Tartariet boende tartarer, som träffats längst nordost i Asien, på ärkebiskop E. Benzelii begäran upsatt af Anbjörn Molin* (*Account of the Tartars dwelling in Great Tartary who were met with at the north-east extremity of Asia, written at the request of Archbishop E. Benzelius by Anbjörn Molin*), published in Stockholm in 1880 by Aug. Strindberg, after a manuscript in the Linköping library.

freeboard, when the vessel was loaded, three and a half feet. The first voyage took place in June 1716. The voyagers began to sail along the coast towards the north-east, but an unfavourable wind drove the vessel, almost against the will of the seafarers, right across the sea to Kamchatka. The first land sighted was a cape which juts out north of the river Tigil. Being unacquainted with the coast the seafarers hesitated to land. During the delay a change of wind took place, whereby the vessel was driven back towards the coast of Okotsk. The wind again becoming favourable, the vessel was put about and anchored successfully in the Tigil. The men who were sent ashore found the houses deserted. For the Kamchadales being terrified at the large ship had made their escape to the woods. The seafarers sailed on along the coast and landed at several places in order that they might meet with the inhabitants, but for a long time without success, until at last they fell in with a Kamchadal girl, who was collecting edible roots. With her as a guide they soon found dwellings, and even Cossacks, who had been sent out to collect tribute. They wintered at the river Kompakova. During the winter the sea cast up a whale, which had in its carcase a harpoon of European manufacture and with Latin letters. The vessel left the winter haven in the middle of May (new style) 1717, but meeting with ice-fields was beset in them for five and a half weeks. This occasioned great scarcity of provisions. In the end of July the seafarers were again back at Okotsk. From this time there has been regular communication by sea between this town and Kamchatka. The master of the vessel during the first voyage across the Sea of Okotsk was the Cossack SOKOLOV.[1]

[1] Müller, iii. p. 102. According to an oral communication by Busch, Strahlenberg's account (p. 17) of this voyage appears to contain several mistakes. The year is stated as 1713, the return voyage is said to have occupied six days.

From what I have stated it follows that, thanks to the fondness of the hunters and Cossacks for adventurous exploratory expeditions, the current ideas regarding the distribution of the land and the courses of the rivers in north-eastern Asia were in the main correct. But, in consequence of want of knowledge of, or of doubts regarding, Deschnev's discoveries,



MAP OF ASIA.
From an Atlas published by the Russian Academy of Sciences in 1737.

there prevailed an uncertainty whether Asia at its north-east extremity was connected with America by a small neck of land, in the same way as it is with Africa, or as North and South America are connected with each other, a view which, in consequence of the unscientific necessity of generalising inherent in man, and the wish to have an explanation of

how the population extended from the old to the new world, was long zealously defended.[1] No one, either European or native, had yet, so far as we know, extended his hunting journeys to the northernmost promontory of Asia, in consequence of which the position which it was assumed to occupy only depended on loose suppositions. It was possible for instance that Asia stretched with a cape as far as to the neighbourhood of the Pole, or that a broad isthmus between the Pjäsina and the Olenek connected the known portion of this quarter of the world with an Asiatic Polar continent. Nor had geographers a single actual determination of position or geographical measurement from the whole of the immense stretch between the mouth of the Ob and Japan, and there was complete uncertainty as to the relative position of the eastern-most possessions of the Russians on the one side and of Japan on the other.[2] It was difficult to get the maps of the Russians to correspond with those of the Portuguese and the Dutch, at the point where the discoveries of the different nations touched each other; which also was exceedingly natural, as at that time too limited an extent east and west by 1700 kilometres was commonly assigned to Siberia. In order to investigate this point, in order to fill up the great blank which still existed in the knowledge of the quarter of the world first inhabited by

[1] As late as 1819, James Burney, first lieutenant on one of Captain Cook's vessels during his voyage north of Behring's Straits, afterwards captain and member of the Royal Society, considered it not proved that Asia and America are separated by a sound. For he doubted the correctness of the accounts of Deschnev's voyage. Compare James Burney, *A Chronological History of North-eastern Voyages of Discovery*. London, 1819, p. 298; and a paper by Burney in the *Transactions* of the Royal Society, 1817. Burney was violently attacked for the views there expressed by Captain John Dundas Cochrane. *Narrative of a Pedestrian Journey through Russia and Siberian Tartary*, 2nd ed. London, 1824, Appendix.

[2] The first astronomical determinations of position in Siberia were, perhaps, made by Swedish prisoners of war; the first in China by Jesuits (Cf. *Strahlenberg*, p. 14).

man, and perhaps above all for the purpose of forming new commercial treaties and of discovering new commercial routes, Peter the Great during the latest years of his life arranged one of the greatest geographical expeditions which the history of the world can show. It was not until after his death, however, that it was carried out, and then it went on for a series of years on so large a scale that whole tribes are said to have been impoverished through the severe exactions of transport that were on its account imposed on the inhabitants of the Siberian deserts. Its many different divisions are now comprehended under the name—*the Great Northern Expedition.* Through the writings of Behring, Müller, Gmelin, Steller, Krascheninnikov and others, this expedition has acquired an important place for all time in the history not only of geography but also of ethnography, zoology, and botany; and even now the inquirer, when the natural conditions of North Asia are in question, must return to these works. I shall therefore, before drawing this chapter to a close, give a brief account of its principal features.

The Great Northern Expedition was ushered in by "the first expedition to Kamchatka." The commander of this expedition was the Dane VITUS BEHRING, who was accompanied by Lieutenant MORTON SPANGBERG, also a Dane by birth, and ALEXEI CHIRIKOV. They left St. Petersburg in February 1725, and took the land route across Siberia, carrying with them the necessary materials with which in Kamchatka to build and equip the vessel with which they should make their voyage of exploration. More than three years were required for this voyage, or rather for this geographico-scientific campaign; in which for the transport of the stores and the shipbuilding material that had to be taken from Europe the rivers Irtisch, Ob, Ket, Yenisej, Tunguska, Ilim, Aldan, Maja, Yudoma, and Urak were taken advantage of. It was not until the $\frac{15}{4}$th April that a beginning could be made at Nischni Kamchatskoj Ostrog of the

building of the vessel, which was launched on the $\frac{21st}{10th}$ July; and on the $\frac{31st}{20th}$ of the same month Behring began his voyage.

He sailed in a north-easterly direction along the coast of Kamchatka, which he surveyed. On the $\frac{19}{8}$th August in 64° 30′ N.L. he fell in with Chukches, who had still a reputation among the Russians for invincible courage and ferocity. First one of them came to the vessel, swimming on two inflated seal-skins, "to inquire what was intended by the vessel's coming thither," after which their skin-boat lay to. Conversation was carried on with them by means of a Koryäk interpreter. On the $\frac{21st}{10th}$ August St. Lawrence Island was discovered, and on the $\frac{26}{15}$th of the same month the explorers sailed past the north-eastern promontory of Asia in 67° 18′ and observed that the coast trends to the west from that point, as the Chukches had before informed them. Behring on this account considered that he had fulfilled his commission to ascertain whether Asia and America were separated, and he now determined to turn, "partly because if the voyage were continued along the coast ice might be met with, from which it might not be so easy to get clear, partly on account of the fogs, which had already begun to prevail, and partly because it would be impossible, if a longer stay were made in these regions, to get back the same summer to Kamchatka. There could be no question of passing the winter off the coast of the Chukch Peninsula, because that would have been to expose the expedition to certain destruction, either by being wrecked on the jagged rocks of the open unknown coast, or by perishing from want of fuel, or finally by dying under the hands of the fierce unconquered Chukches." On the $\frac{1st\ Oct.}{20th\ Sept.}$ the vessel returned to Nischni Kamchatskoj Ostrog.[1] It was during this voyage that

[1] A short, but instructive account of Behring's first voyage, based on an official communication from the Russian Government to the King of Poland, is inserted in t. iv. p. 561 of *Description géographique de l'Empire de la Chine, par le P. J. B. Du Halde*, La Haye, 1736. The same official report was probably the source of Müller's brief sketch of the voyage (*Müller*,

the sound, which has since obtained the name of Behring's Straits, is considered to have been discovered. But it is now known that this discovery properly belongs to the gallant hunter Deschnev, who sailed through these straits eighty years before. I suppose therefore that the geographical world will with pleasure embrace the proposal to attach the name of Deschnev along with that of Behring to this part of our globe; which may be done by substituting Cape Deschnev, as the name of the easternmost promontory of Asia, for that of East Cape, an appellation which is misleading and unsuitable in many respects. Several statements by Kamchadales regarding a great country towards the east on the other side of the sea, induced Behring the following year to sail away in order to ascertain whether this was the case. In consequence of unfavourable weather he did not succeed in reaching the coast of America, but returned with his object unaccomplished, after which he sailed to Okotsk, where he arrived on the $\frac{\text{3rd Aug.}}{\text{22nd July,}}$ 1729. Hence he betook himself immediately to St. Petersburg, which he reached after a journey of six months and nine days.

In maps published during Behring's absence, partly by Swedish officers who had returned from imprisonment in Siberia,[1] Kamchatka had been delineated with so long an extension towards the south that this peninsula was connected with Yezo, the northernmost of the large Japanese islands. The distance between Kamchatka and Japan, rich in wares, would thus have been quite inconsiderable. This nearness was believed to be further confirmed by another Japanese ship, manned by seventeen men and laden with silk, rice, and paper, having stranded in July 1729 on Kamchatka, south of Avatscha Bay. In this neighbourhood there was, along with a number of natives, a

iii. p. 112). A map of it is inserted in the 1735 Paris edition of Du Halde's work, and in *Nouvel Atlas de la Chine, par M. D'Anville*, La Haye, 1737.

[1] *Histoire généalogique des Tartares* (note, p. 107), and Strahlenberg's oft-quoted work (map, text, pp. 31 and 384).

small party of Cossacks under the command of ANDREAS SCHTINNIKOV. He at first accepted several presents from the shipwrecked men, but afterwards withdrew from the place where the wreck took place. When the Japanese on this account rowed on in their boats along the coast, Schtinnikov gave orders to follow them in a *baydar* and kill them all but two. The cruel deed was carried into execution, on which the malefactors took possession of the goods, and broke in pieces the boats in order to obtain the iron with which the boards were fastened together. The two Japanese who were saved were carried to Nischni Kamchatskoj Ostrog. Here Schtinnikov was imprisoned and hanged for his crime. The Japanese were sent to St. Petersburg, where they learned the Russian language and were converted to Christianity, while some Russians in their turn learned Japanese. The Japanese died between 1736 and 1739. Both were from Satsuma; the elder, SOSA, had been a merchant, and the younger, GONSA, was a pilot's son. Their vessel had been bound for Osaka, but having been carried out of its course by a storm, had drifted about at sea for six months, stranding at last with so unfortunate a result for the greater part of the crew.

This sad occurrence further reminds us that much still remained unaccomplished with respect to the geography of north-eastern Asia. Behring's Kamchatka expedition had besides yielded no information regarding the position of the northern extremity of Asia, or of the part of America lying opposite to Kamchatka. A number of grave doubts appear besides to have been started as to the correctness of the observations during Behring's first voyage. All this induced him to make proposals for a continuation of his explorations, offering, along with his former companions, Spangberg and Chirikov, to take the command of the maritime expedition which was to start from Kamchatka to solve the questions proposed, both eastwards to ascertain the position of the east coast of Asia in relation to the west coast of America, and

southwards to connect the areas which the West-Europeans and the Russians were exploring.

The Russian senate, the Board of Admiralty, and the Academy of Sciences were commissioned to develop this plan and to carry it into execution. With respect to the way in which the commission was executed I may be allowed to refer to Müller's oft-quoted work, and to a paper by VON BAER: *Peters des Grossen Verdienste um die Erweiterung der geographischen Kenntnisse* (*Beiträge zur Kenntniss des Russischen Reiches*, B. 16, St. Petersburg, 1872). Here I can only mention that it was principally through the untiring interest which KIRILOV, the secretary of the senate, took in the undertaking, that it attained such a development that it may be said to have been perhaps the greatest scientific expedition which has ever been sent out by any country. It was determined at the same time not only to ascertain the extent of Siberia to the north and east, but also to examine its hitherto almost unknown ethnographical and natural conditions. For this purpose the Great Northern Expedition was divided into the following divisions:—

1. *An expedition to start from Archangel for the Ob.*[1]—For this expedition two *kotsches* were employed, the *Ob* and the *Expedition*, 52½ feet long, 14 feet broad, and 8 feet deep, each manned with 20 men. The vessels, which were under the command of Lieutenants PAULOV and MURAVJEV, left Archangel on the $\frac{15}{4}$th July, 1734. The first summer they only reached Mutnoi Saliv in the Kara Sea, whence they returned to the Petchora and wintered at Pustosersk. The following year they broke up in

[1] This expedition was under the command of the Admiralty; the others under that of Behring. In my account I have followed partly Müller and partly Wrangel, of whom the latter, in his book of travels, gives a historical review of previous voyages along the coasts of the Asiatic Polar Sea. The accounts of the voyages between the White Sea and the Yenisej properly belong to a foregoing chapter in this work, but I quote them first here in order that I may treat of the different divisions of the Great Northern Expedition in the same connection.

June, but did not penetrate farther than in 1734. The unfavourable issue was ascribed to the vessels' unserviceableness for voyages in the Polar Sea, in consequence of which the Board of Admiralty ordered two other boats, 50 to 60 feet long, to be built for the expedition, which were placed under the command of SKURATOV and SUCHOTIN, Muravjev being besides replaced by MALYGIN who sailed with the old vessels on the $\frac{7\text{th June.}}{27\text{th May.}}$ 1736, down the Petchora river, at whose mouth the *Expedition* was wrecked. Without permitting himself to be frightened by this, Malygin ordered his men to go on board the other vessel, in which with great dangers and difficulties they penetrated through the drift-ice to Dolgoj Island. Here on the $\frac{15}{7}$th August they fell in with the new vessels sent from Archangel. Suchotin was now sent back to Archangel on board the *Ob;* Malygin and Skuratov sailed in the new vessels to the Kara river and wintered there. During the winter 1736-1737 the men suffered only slightly from scurvy, which was cured by anti-scorbutic plants growing in the region. The ice in the Kara river did not break up until the $\frac{12\text{th}}{1\text{st}}$ June, but so much ice still drifted about in the sea that a start could not be made until the $\frac{14\text{th}}{3\text{rd}}$ July. On the $\frac{4\text{th Aug.}}{24\text{th July}}$ the vessels anchored in the sound which I have named Malygin Sound. Here they were detained by head winds 25 days. Then they sailed on round a cape, which the Samoyeds call Yalmal, up the Gulf of Ob to the mouth of the river, which was reached on the $\frac{22\text{nd}}{11\text{th}}$ September, 1737, and then up the river to Soswa, where the vessels were laid up in winter quarters. The crews were taken to Beresov. Malygin returned to Petersburg, after having given Lieut. Skuratov and the second mate Golovin a commission to carry the vessels back to the Dwina the following year. They did not get back until August 1739. The return voyage thus also occupied two years, and was attended with much difficulty and danger.

Six years in all had thus gone to the voyage from Archangel to the Ob and back, which now can be accomplished without

difficulty in a single summer. By means of Malygin's and Skuratov's voyages, and of a land journey which the land-measurer Selifontov undertook during July and August 1736 with reindeer along the west coast of Yalmal and then by boat to Beli Ostrov, Yalmal and the south coast of this large island were mapped, it would appear in the main correctly.[1]

2. *An expedition to sail from the Ob to the Yenisej.*—For this Behring ordered a double sloop, the *Tobol*, 70 feet long, 15 feet broad, and 8 feet deep, to be built at Tobolsk. The vessel had two masts, was armed with two small cannon, and was manned with 53 men, among whom were a land-measurer and a priest. The commander was Lieut. OWZYN. They sailed in company with some small craft carrying provisions from Tobolsk on the $\frac{26}{13}$th May, 1734, and came to the Gulf of Ob through the easternmost mouth-arm of the river on the $\frac{30}{18}$th June. There a storm damaged the tender-vessels. Of the timber of those which had sustained most damage, a storehouse was erected in 66° 36′ N.L., in which the provisions landed from the unserviceable craft were placed. When this was done they sailed on, but slowly in consequence of unfavourable winds and shallow water, so that it was not until the $\frac{17}{6}$th August that they reached 70° 4′ N.L. Hence they returned to Obdorsk, arriving there on the $\frac{15}{4}$th September. Seven days afterwards the Ob was covered with ice.

The following spring the voyage was resumed. On the $\frac{17}{6}$th June they came to the depôt formed the preceding year. At first ice formed an obstacle, but on the $\frac{31st}{16th}$ July it broke up, and the navigable water became clear. The crew had now begun to suffer so severely from scurvy, that of 53 only 17 were in good health; Owzyn therefore turned, that he might bring his sick men to Tobolsk. He reached this town on the $\frac{17}{6}$th October, and the river froze over soon after. Owzyn now travelled to St. Petersburg in order to give in, in person, reports of his unsuc-

[1] Wrangel, i. p. 36.

cessful voyages and to make suggestions as to the measures that ought to be taken to ensure better success to next year's undertaking. His proposals on this point were mainly in the direction of building at Tobolsk a new vessel, which should accompany the *Tobol* during the dangerous voyage, and confer upon it greater safety. This was approved by the Board of Admiralty, but the vessel could not be got ready till the summer of 1736, on which account that year's voyage was undertaken in the same way as that of the preceding year, and with the same success. The new vessel was not ready until 1737. It came with the shipbuilder KOSCHELEV and the mate MININ on the $\frac{16}{5}$th June to Obdorsk, where Owzyn took command of it, handing over the old one to Koschelev, and beginning his fourth voyage down the Gulf of Ob. This time he had better success. After sailing past Gyda Bay, he came, without meeting with any serious obstacles from ice, on the $\frac{21}{16}$th August to Cape Mattesol, and on the $\frac{12\text{th}}{1\text{st}}$ September to a storehouse erected for the expedition by the care of the authorities on the bank of the Yenisej in 71° 33′ N.L. The Yenisej froze over on the $\frac{21\text{st}}{10\text{th}}$ October.

Four years had thus gone to the accomplishment of Owzyn's purpose, but it can scarcely be doubted that if he had not turned so early in the season, and if he had had steam, or a sailing vessel of the present day at his disposal he would have been able to sail from the Ob to the Yenisej in a few weeks. It is at all events Owzyn's perseverance to which we are in great measure indebted for the mapping of the Gulf of Ob, and the Bays of Tas and Gyda.[1]

3. *Voyages from the Yenisej towards Cape Taimur.*—In the winter of 1738 Owzyn and Koschelev were called to St. Petersburg to answer for themselves with reference to a complaint lodged against them by the men under their command.[2] In

[1] Wrangel, i. p. 38.

[2] According to P. von Haven (*Nye og forbedrede Efterretningar om det Russiske Rige*, Kjöbenhavn, 1747, ii. p. 20), "it was the custom in Peters-

their room Minin got the command of the expedition which was to endeavour to penetrate farther eastwards along the coast of the Polar Sea. The two first summers, 1738 and 1739, Minin could not get further than to the northernmost *simovies* on the Yenisej. But in 1740 he succeeded, as it appears in pretty open water, in reaching on the west coast of the Taimur Peninsula the latitude of 75° 15′. Here he turned on the $\frac{\text{1st Sept.}}{\text{21st Aug.}}$ on account of "impenetrable" ice, but mainly in consequence of the late season of the year. The preceding winter Minin had sent his mate STERLEGOV in sledges to examine the coast. On the $\frac{25}{14}$th April he reached 75° 26′ N.L., and there erected a stone cairn on a rock jutting out into the sea. Many open places appear to have been seen in the offing. Minin and his party returned on account of snow-blindness, and during the return voyage rested for a time at a *simovie* on the river Pjäsina, whose existence there shows how far the Russian hunters had extended their journeys.[1]

4. *Voyage from the Lena Westward.*—On the $\frac{\text{30th July,}}{\text{11th June,}}$ 1735, two expeditions started from Yakutsk, each with its double sloop, accompanied by a number of boats carrying provisions. One of these double sloops was to go in an easterly direction under the command of Lieut. LASSINIUS. I shall give an account of his voyage farther on. The other was commanded by Lieut.

burg to send away those whose presence was inconvenient to help Behring to make new discoveries." It also went very ill with many of the gallant Russian Polar travellers, and many of them were repaid with ingratitude. Behring was received on his return from his first voyage, so rich in results, with unjustified mistrust. Steller was exposed to continual trouble, was long prevented from returning from Siberia, and finally perished during his journey home, broken down in body and soul. Prontschischev and Lassinius succumbed to hardships and sufferings during their voyages in the Polar Sea. Owzyn was degraded, among other things, because he used to be too intimate at Obdorsk with exiles formerly of distinction. A few years before the voyage of the *Vega*, Chelyuskin's trustworthiness was still doubted. All the accounts of discoveries of islands and land in the Polar Sea by persons connected with Siberia, have till the most recent times, been considered more or less fictitious; yet they are clearly in the main true.

[1] Wrangel, i. p. 46.

PRONTSCHISCHEV, whose object was to go from the Lena westwards, if possible, to the Yenisej. The voyage down the river was successful and pleasant. The river was from four to nine fathoms deep, and on its banks, overgrown with birch and pine, there were numerous tents and dwelling-houses whose inhabitants were engaged in fishing, which gave the neighbourhood of the river a lively and pleasant appearance.[1] On the $\frac{13\text{th}}{2\text{nd}}$ August the explorers came to the mouth of the river, which here divides into five arms, of which the easternmost was chosen for sailing down to the Polar Sea. Here the two seafarers were to part. Prontschischev staid at the river-mouth till the $\frac{25}{14}$th August. He then sailed in $1\frac{1}{2}$ to $2\frac{1}{2}$ fathoms water along the shore of the islands which are formed by the mouth-arms of the Lena. On the $\frac{6\text{th Sept.}}{26\text{th Aug.}}$ he anchored in the mouth of the Olenek. A little way up the river some dwelling-houses were met with, which hunters had built for use during summer. These were put in order for winter, which passed happily. On the $\frac{2\text{nd July}}{21\text{st June}}$ the ice broke up at the winter quarters, but in the sea it lay still until the $\frac{14\text{th}}{3\text{rd}}$ August, and it was only then that Prontschischev could go to sea. The course was shaped for the north-east. The Chatanga was reached on the $\frac{24}{13}$th August. On the beach, in 74° 48′ N. L., a hut was met with in which were found newly baked bread and some dogs, and which therefore appeared to belong to some Russian hunters absent at the time. While sailing on along the coast the explorers, after having passed two bays projecting into the land, came to an inlet which they erroneously took for the mouth of the Taimur river. Among the reasons for this supposition is mentioned the immense number of gulls

[1] According to Wrangel (i., note at p. 38 and 48), probably after a quotation from Prontschischev's journal. The Lena must be a splendid river, for it has since made the same powerful impression, as on the seamen of the Great Northern Expedition, on all others who have traversed its forest-crowned river channel.

which swarmed round the vessel in that region. The bay was covered with fast ice, "which probably never breaks up," and broad ice-fields stretched out to sea from the coast, on which Polar bears were seen.

On the $\frac{31st}{20th}$ August, in 77° 29′ N.L., the vessel was suddenly surrounded with so large masses of ice that it could make no further progress, and was every instant in danger of being nipped. Prontschischev therefore determined to turn, but this at first was rendered impossible by a complete calm, a crust of ice being formed at the same time in open places between the pieces of drift-ice. If the latitude stated is correct, the turning point lay quite close to the northernmost promontory of Asia. With a better vessel, and above all with the help of steam, Prontschischev would certainly have rounded it. The unbroken ice which he mentioned several times in his narrative, ought probably to be interpreted as belts of pretty closely packed drift-ice. Many times during my Arctic voyages have I sailed through belts of ice which, when observed from a boat some hundred yards from their borders, have been reported as immense unbroken ice-fields. On the $\frac{5th\ Sept.}{25th\ Aug.}$ a high north wind began to blow which drove the vessel, with the surrounding ice-fields, towards the south. The voyagers had doubts as to their being saved, but the gusts of wind broke up the ice so that the vessel got free and could sail to the mouth of the Chatanga, which, however, was already frozen over. The explorers were therefore compelled to continue their voyage towards the Olenek, whose mouth was reached on the $\frac{8th\ Sept.}{28th\ Aug.}$ In the neighbourhood of the haven which they intended to make, they were driven about by contrary winds and drift-ice about six days more, exposed to cold and wet, and worn out by exertions and privations of every description. Prontschischev, who before had been sick, died of his illness on the $\frac{10th\ Sept.}{30th\ Aug.}$ to the great sorrow of his men, by whom he was held in great regard. The mate, CHELYUSKIN, now took the command. On

the $\frac{14\text{th}}{3\text{rd}}$ Sept. he succeeded in carrying his vessel into the river Olenek. On its bank Prontschischev was buried with all the solemnities which circumstances permitted. To Prontschisnev's melancholy fate there attaches an interest which is quite unique in the history of the Arctic exploratory voyages. He was newly married when he started. His young wife accompanied him on his journey, took part in his dangers and sufferings, survived him only two days, and now rests by his side in the grave on the desolate shore of the Polar Sea.

On the $\frac{9\text{th Oct.}}{28\text{th Sept.}}$ the Olenek was frozen over and the winter became very severe for Chelyuskin and his companions. The following summer they returned to Yakutsk convinced of the impossibility of sailing round the north point of Asia, and as Behring was no longer to be found in that town, Chelyuskin started for St. Petersburg in order to give an oral account of Prontschischev's voyages. The Board of Admiralty, however, did not favour Chelyuskin's views, but considered that another attempt ought to be made by land, but if this, too, was unsuccessful, that the coast should be surveyed by land journeys. Lieut. CHARITON LAPTEV was appointed to carry out this last attempt to reach the Yenisej by sea from the Lena.

Laptev, accompanied by a number of small craft carrying provisions, left Yakutsk on the $\frac{2}{9}$0th July, 1739, and on the $\frac{31\text{st}}{20\text{th}}$ of the same month reached the mouth-arm of the Lena called Krestovskoj, on which he built, on a point jutting out into the sea, a high signal tower, one of the few monuments that are to be found on the north coast of Asia, and which is on that account mentioned by succeeding travellers in those regions. He sailed hence along the coast past the mouth of the Olenek and past a large bay to which, for what reason I know not, he gave the purely Swedish name of Nordvik. This bay was still covered with unbroken ice. After having been beset for several days in Chatanga Bay, the voyagers on the $\frac{31\text{st}}{20\text{th}}$ August reached Cape Thaddeus, where the vessel was anchored the following day in

76° 47′ N. L. A signal tower was built on the extremity of the cape, and the land-measurer CHEKIN was sent to examine the neighbouring territory, and Chelyuskin to search for the mouth of the river Taimur. Chekin could carry out no geodetic work on account of mist. Chelyuskin again reported that the whole bay and the sea in the offing were, as far as the eye could reach, covered with unbroken ice. This induced Laptev to turn. After many difficulties among the ice, he came, on the $\frac{\text{7th Sept.}}{\text{27th Aug.}}$ to the confluence of the river Bludnaya with the Chatanga. Here the winter was passed among a tribe of Tunguses living on the spot, who owned no reindeer, and were therefore settled. They used dogs as draught animals, and appear to have carried on a mode of life resembling that of the coast Chukches.

In spring Chekin was sent to map the coast between the Taimur and the Pjäsina. With thirty dog-sledges and accompanied by a nomad Tunguse with eighteen reindeer,[1] he travelled over land to the Taimur river, followed its course to the sea, and then the coast towards the west of a distance of 100 versts. Scarcity of provisions and food for his dogs compelled him to turn. Laptev himself, convinced as he was of the impossibility of rounding the north point of Asia, now wished to carry back his vessel and the most of his stores to the Lena. After having with great danger and difficulty sailed down the river to the Polar Sea, reaching it on the $\frac{\text{10th Aug.}}{\text{30th July,}}$ the vessel on the $\frac{24}{13}$th was beset and nipped between pieces of ice, according to a statement on a Russian map published in 1876 by the Hydrographical Department in St. Petersburg, on the east coast of the Taimur Peninsula in 75° 30′ N.L. Six days after there was a strong frost, so that thin ice was formed between the blocks of drift-ice. Some

[1] These all perished "for want of fodder." This, however, is improbable. For, in 1878, we saw numerous traces of these animals as far to the northward as Cape Chelyuskin, and very fat reindeer were shot both in 1861 and 1873, on the Seven Islands, the northernmost of all the islands of the Old World, where vegetation is much poorer than in the regions now in question.

foolhardy fellows went over the weakly frozen together pieces of ice to land. Three days after Laptev himself and the rest of the men could leave the vessel. Several streams, still unfrozen, lying between them and their old winter station, however, prevented them from going further. They endeavoured to get protection from the cold by digging pits in the frozen earth and lying down in them by turns one after the other. The men were sent daily to the vessel to fetch as much as possible of the provisions left behind, but on the $\frac{\text{10th Sept.}}{\text{20th Aug.}}$ the ice again broke up, and carried the abandoned vessel out to sea.

By the $\frac{\text{2nd Oct.}}{\text{21st Sept.}}$ the streams at last had frozen so much that the return journey could be begun to the former year's winter station distant more than 500 kilometres. The journey through the desolate *tundra*, perhaps never before trodden by the foot of man, was attended with extreme difficulties, and it was twenty-five days before Laptev and his men could again rest in a warmed hut and get hot food. Twelve men perished of cold and exhaustion. Laptev now determined to remain here during the winter and to go the following spring over the *tundra* to the Yenisej, where he hoped to find depôts with provisions and ammunition. Nor did he now remain inactive. For he did not wish to return until the surveys were complete. For want of vessels these were to be made by land. Such of the men as were not required were therefore sent in spring over the *tundra* to the Yenisej and the rest divided into three parties under Laptev himself, Chekin, and Chelyuskin, who were to survey each his portion of the coast between the Chatanga and the Pjäsina and then meet at the Yenisej. These journeys were successfully accomplished; the explorers travelled several times without, it would appear, excessive difficulty, over the desolate *tundra* between the Chatanga and the Taimur rivers, discovered Lake Taimur, and surveyed considerable stretches of the coast. But when they were all again assembled at Dudino, it was found that the north point of Asia had not yet been travelled round and

surveyed. This was done in 1742 by Chelyuskin in the course of a new sledge journey, of which the particulars are only incompletely known, evidently because Chelyuskin's statement, that he had reached the northernmost point of Asia, was doubted down to the most recent times. After the voyage of the *Vega*, however, there can be no more doubt on this point.[1]

5. *Voyages from the Lena Eastward.*—During these Lieutenant Lassinius and after his death Lieutenant DMITRI LAPTEV had the command. A double sloop was built at Yakutsk for the voyage of Lassinius. As I have already mentioned, he left this town, accompanied by several cargo-boats, at the same time as Prontschischev, and both sailed together down the Lena to its mouth. Lassinius was able to sail to the eastward as early as the $\frac{20}{9}$th August. Four days after he came upon so much drift-ice that he was compelled to lie to at the mouth of the river, 120 versts to the east of the easternmost mouth-arm of the Lena. Here abundance of driftwood was met with, and the stock of provisions appears also to have been large, but notwithstanding this, scurvy broke out during the winter. Lassinius himself and most of his men died. On being informed of this, Behring sent a relieving party, consisting of Lieutenant CHERBININ and fourteen men to Lassinius' winter quarters. On their arrival on the $\frac{15}{4}$th June they found only the priest, the mate, and seven sailors alive of the fifty-three men who had started with Lassinius the foregoing year from Yakutsk. These too were so ill that some of them died during the return journey to Yakutsk. Dmitri Laptev and a sufficient number of men, were sent at the same

[1] Wrangel, i. pp. 48 and 72. Of the journey round the northernmost point of Asia, Wrangel says:—"Von der Tajmur-Mündung bis an das Kap des heiligen Faddej konnte die Küste nicht beschifft werden, und die Aufnahme, die der Steuermann Tschemokssin (Chelyuskin) auf dem Eise in Narten vornahm, ist so oberflächlich und unbestimmt, dass die eigentliche Lage des nordöstlichen oder Tajmur-Kaps, welches die nördlichste Spitse Asiens ausmacht, noch gar nicht ausgemittelt ist."

time to take possession of the ship and renew the attempt to sail eastwards. He went to sea on the $\frac{10\text{th Aug.}}{30\text{th July.}}$ At first he had to contend with serious obstacles from ice, and when at last he reached open water he thought himself compelled to turn on account of the advanced season of the year. On the $\frac{2\text{nd Sept.}}{22\text{nd Aug.}}$ he came again to the Bychov mouth-arm of the Lena, up which he found it difficult to make his way on account of the many unknown shoals. On the $\frac{19}{8}$th September the river was frozen over. He wintered a little distance from the mouth; and now again scurvy made its appearance, but was cured by constant exercise in the open air and by a decoction of cedar cones. In a report sent from this place, Dmitri Laptev declared that it was quite impossible to round the two projecting promontories between the Lena and the Indigirka, Capes Borchaja and Svjatoinos, because, according to the unanimous statement of several Yakuts living in the region, the ice there never melts or even loosens from the beach. With Behring's permission he travelled to St. Petersburg to lay the necessary information before the Board of Admiralty. The Board determined that another attempt should be made by sea, and, if that was unsuccessful, that the coast should be surveyed by means of land journeys.

It is now easy to see what was the cause of the unfortunate issue of these two attempts to sail to the eastward. The explorers had vessels which were unsuitable for cruising, they turned too early in the season, and in consequence of their unwillingness to go far from land they sailed into the great bays east of the Lena, from which no large river carries away the masses of ice that have been formed there during the winter, or that have been drifted thither from the sea. Dmitri Laptev and his companions besides appear to have had a certain dislike to the commission intrusted to them, and, differing from Deschnev, they thus wanted the first condition of success—the fixed conviction of the possibility of attaining their object.

By order of the Board of Admiralty Dmitri Laptev at all events began his second voyage, and now falsified his own prediction, by rounding the two capes which he believed to be always surrounded by unbroken ice. After he had passed them his vessel was frozen in on the $\frac{20}{9}$th September. Laptev had no idea at what point of the coast he was, or how far he was from land. He remained in this unpleasant state for eleven days, at the close of which one of the mates who had been sent out from the vessel in a boat on the $\frac{\text{11th Sept.}}{\text{31st Aug.}}$ returned on foot over the ice and reported that they were not far from the mouth of the Indigirka. Several Yakuts had settled on the neighbouring coast, where was also a Russian *simovie*. Laptev and his men wintered there, and examined the surrounding country. The surveyor KINDÄKOV was sent out to map the coast to the Kolyma. Among other things he observed that the sea here was very shallow near the shore, and that driftwood was wanting at the mouth of the Indigirka, but was found in large masses in the interior, 30 versts from the coast.

The following year, 1740, Laptev repaired as well as he could his vessel, which had been injured during the voyage of the preceding year, and then went again to sea on the $\frac{\text{11th Aug.}}{\text{31st July}}$. On the $\frac{\text{14th}}{\text{3rd}}$ August he passed one of the Bear Islands, fixing its latitude at 71° 0′. On the $\frac{25}{14}$th August, when Great Cape Baranov was reached, the progress of the vessel was arrested by masses of ice that extended as far as the eye could reach. Laptev now turned and sought for winter quarters on the Kolyma. On the $\frac{19}{8}$th July, 1741, this river became open, and Laptev went to sea to continue his voyage eastwards, but did not now succeed in rounding Great Cape Baranov. He was now fully convinced of the impossibility of reaching the Anadyr by sea, on which account he determined to penetrate to that river by land in order to survey it. This he did in the years 1741 and 1742. Thus ended the voyages of Dmitri Laptev, giving evidence if not of distinguished seamanship, of great perseverance,

undaunted resolution, and fidelity to the trust committed to him.[1]

6. *Voyage for the purpose of exploring and surveying the coast of America.*—For this purpose Behring fitted out at Okotsk two vessels, of which he himself took the command of one, *St. Paul*, while the other, *St. Peter*, was placed under CHIRIKOV. They left Okotsk in 1740, and being prevented by shoal water from entering Bolschaja Reka, they both wintered in Avatscha Bay, whose excellent haven was called, from the names of the ships, Port Peter-Paul. On the $\frac{15}{4}$th June they left this haven, the naturalist GEORG WILHELM STELLER having first gone on board Behring's and the astronomer LOUIS DE L'ISLE DE LA CROYERE Chirikov's vessel. The course was shaped at first for the S.S.E., but afterwards, when no land could be discovered in this direction, for the N.E. and E. During a storm on the $\frac{\text{1st July}}{\text{20th June}}$ the vessels were separated. On the $\frac{29}{18}$th July Behring reached the coast of America in 58° to 59° N.L. A short distance from the shore Steller discovered here a splendid volcano, which was named St. Elias. The coast was inhabited, but the inhabitants fled when the vessel approached. From this point Behring wished to sail in a north-westerly direction to that promontory of Asia which formed the turning-point of his first voyage. It was however only with difficulty that in the almost constant fog the peninsula of Alaska could be rounded and the vessel could sail forward among the Aleutian island groups. Scurvy now broke out among the crew, and the commander himself suffered

[1] Wrangel, i. p. 62. I have sketched the voyages between the White Sea and the Kolyma, principally after Engelhardt's German translation of Wrangel's Travels. It is, unfortunately, in many respects defective and confused, especially with respect to the sketch of Chariton Laptev and his followers, sledge journeys, undertaken in order to survey the coast between the Chatanga and the Pjäsina. Müller mentions these journeys only in passing. Wrangel gives as sources for his sketch (i. note at p. 38) *Memoirs of the Russian Admiralty*, also the original journals of the journeys. Chelyuskin he calls Chemokssin.

severely from it, on which account the command was mainly in the hands of Lieut. WAXEL. At an island the explorers came into contact with the natives, who at first were quite friendly, until one of them was offered brandy. He tasted the liquor, and was thereby so terrified that no gifts could calm his uneasiness. On this account those of the crew who were on land were ordered to come on board, but the savages wished to detain their guests. At last the Russians were set free, but a Koryäk whom they had taken with them as an interpreter was kept behind. In order to get him set at liberty, Waxel ordered two musket salvos to be fired over the heads of the natives, with the result that they all fell flat down from fright, and the Koryäk had an opportunity of making his escape. Now the fire-water is a liquor in great request among these savages, and they are not frightened at the firing of salvos of musketry.

During the following months Behring's vessel drifted about without any distinct plan, in the sea between Alaska and Kamchatka, in nearly constant fog, and in danger of stranding on some of the many unknown rocks and islands which were passed. On the 5th November the vessel was anchored at an island afterwards called Behring Island. Soon however a great wave arose which threw the vessel on land and crushed it against the rocky coast of the island. Of the wintering there, which, through Steller's taking part in it, became of so great importance for natural history, I shall give an account further on in connection with the narrative of our visit to Behring Island. Here I shall only remind the reader that Behring died of scurvy on the $\frac{19}{8}$th December, and that in the course of the voyage great part of his crew fell a sacrifice to the same disease. In spring the survivors built a new vessel out of the fragments of the old, and on the $\frac{27}{16}$th of August they sailed away from the island where they had undergone so many sufferings, and came eleven days after to a haven on Kamchatka.

After parting from Behring, Chirikov on the $\frac{26}{15}$th July sighted

the coast of America in 56° N.L. The mate ABRAHAM DEMENTIEV was then sent ashore in the longboat, which was armed with a cannon and manned by ten well-armed men. When he did not return, another boat was sent after him. But this boat too did not come back. Probably the boats' crews were taken prisoners and killed by the Indians. After making another attempt to find his lost men, Chirikov determined to return to Kamchatka. He first sailed some distance northwards along the coast of America without being able to land, as both the vessel's boats were lost. Great scarcity of drinking-water was thus occasioned, which was felt the more severely as the return voyage was very protracted on account of head-winds and fog. During the voyage twenty-one men perished, among them de l'Isle de la Croyère, who died, as is said often to be the case with scurvy patients on board ship, while he was being carried from his bed up on deck to be put on land.[1]

The voyages of Behring and Chirikov, attended as they were by the sacrifice of so many human lives, gave us a knowledge of the position of North-western America in relation to that of North-eastern Asia, and led to the discovery of the long volcanic chain of islands between the Alaska peninsula and Kamchatka.

7. *Voyages to Japan.*—For these Captain SPANGBERG ordered a *hucker*, the *Erkeengeln Michael*, and a double sloop, the *Nadeschda*, to be built at Okotsk, the old vessel *Gabriel* being at the same time repaired for the same purpose. Spangberg himself took command of the *Michael*, that of the double sloop was given to Lieutenant WALTON, and of the *Gabriel* to Midshipman CHELTINGA. Drift-ice prevented a start until midsummer, and on that account nothing more could be done the first year (1738) than to examine the Kurile Islands to the 46th degree of latitude. From this point the vessels returned to Kamchatka,

[1] In this account of Behring's and Chirikov's voyages, I have followed Müller (iii. pp. 187-268). More complete original accounts of Behring's voyage are quoted further on in the sketch of our visit to Behring Island.

where they wintered at Bolschaja Reka. On the $\frac{\text{2nd June}}{\text{22nd May}}$, 1739, Spangberg with his little fleet again left this haven. All the vessels kept together at first, until in a violent storm attended with fog Spangberg and Cheltinga were parted from Walton. Both made a successful voyage to Japan and landed at several places, being always well received by the natives, who appeared to be very willing to have dealings with the foreigners. During the return voyage Spangberg landed in 43° 50′ N.L. on a large island north of Nippon. Here he saw the Aino race, enigmatical as to its origin, distinguished by an exceedingly abundant growth of hair and beard which sometimes extends over the greater part of the body. Spangberg returned to Okotsk on the $\frac{\text{9th November}}{\text{29th October}}$. Walton sailed along the coast in a southerly direction to 33° 48′ N.L. Here was a town with 1,500 houses, where the Russian seafarers were received in a very friendly way even in private houses. Walton subsequently landed at two other places on the coast, returning afterwards to Okotsk, where he anchored on the $\frac{\text{1st September}}{\text{21st August}}$.[1]

The very splendid results of Spangberg's and Walton's voyages by no means corresponded with the maps of Asia constructed by the men who were at that time leaders of the Petersburg Academy. Spangberg therefore during his return journey through Siberia got orders to travel again to the same regions in order to settle the doubts that had arisen. A new vessel had to be built, and with this he started in 1741 from Okotsk to his former winter haven in Kamchatka. Hence he sailed in 1742 in a southerly direction, but he had scarcely passed the first of the Kurile Islands when the vessel became so leaky that he was compelled to turn. The second expedition of Spangberg to Japan was thus completely without result, a circumstance evidently brought about by the unjustified and offensive doubts which led to it, and the arbitrary way in which it was arranged at St. Petersburg.

8. *Journeys in the interior of Siberia* by Gmelin, Müller,

[1] Müller, iii. p. 164.

Steller, Krascheninnikov, de l'Isle de la Croyère, &c.—The voyages of these *savants* have indeed formed an epoch in our knowledge of the ethnography and natural history of North Asia, but the north coast itself they did not touch. An account of them therefore lies beyond the limits of the history which I have undertaken to relate here.

The Great Northern Expedition by these journeys both by sea and land had gained a knowledge of the natural conditions of North Asia based on actual researches, had yielded pretty complete information regarding the boundary of that quarter of the globe towards the north, and of the relative position of the east coast of Asia and the west coast of America, had discovered the Aleutian Islands, and had connected the Russian discoveries in the east with those of the West-Europeans in Japan and China.[1] The results were thus very grand and epoch-making. But these undertakings had also required very considerable sacrifices, and long before they were finished they were looked upon in no favourable light by the Siberian authorities, on account of the heavy burden which the transport of provisions and other equipment through desolate regions imposed upon the country. Nearly twenty years now elapsed before there was a new exploratory expedition in the Siberian Polar Sea worthy of being registered in the history of geography. This time it was a private person, a Yakutsk merchant, SCHALAUROV, who proposed to repeat Deschnev's famous voyage and to gain this end sacrificed the whole of his means and his life itself. Accompanied by an exiled midshipman, IVAN BACHOFF, and with a crew of deserters and deported men, he

[1] It deserves to be noted as a literary curiosity that the famous French *savant* and geographer, Vivien de Saint Martin, in his work, *Histoire de la Géographie et des Découvertes géographiques*, Paris, 1873, does not say a single word regarding all those expeditions which form an epoch in our knowledge of the Old World.

sailed in 1760 from the Lena out into the Polar Sea, but came the first year only to the Yana, where he wintered. On the $\frac{9\text{th August}}{29\text{th July}}$, 1761, he continued his voyage towards the east, always keeping near the coast. On the $\frac{17}{6}$th September he rounded the dreaded Svjatoinos, sighting on the other side of the sound a high-lying land, Ljachoff's Island. At the Bear Islands, whither he was carried by a favourable wind over an open sea, he first met with drift-ice, although, it appears, not in any considerable quantity. But the season was already far advanced, and he therefore considered it most advisable to seek winter quarters at the mouth of the neigbouring Kolyma river. Here he built a spacious winter dwelling, which was surrounded by snow ramparts armed with cannon from the vessel; probably the whole house was not so large as a peasant's cabin at home, but it was at all events the grandest palace on the north coast of Asia, often spoken of by later travellers, and regarded by the natives with amazed admiration. In the neighbourhood there was good reindeer hunting and abundant fishing, on which account the winter passed so happily, that only one man died of scurvy, an exceedingly favourable state of things for that period.

The following year Schalaurov started on the $\frac{1\text{st August}}{21\text{st July}}$, but calms and constant head-winds prevented him from passing Cape Schelagskoj, until he was compelled by the late season of the year to seek for winter quarters. For this he considered the neighbouring coast unsuitable on account of the scarcity of forests and driftwood; he therefore sailed back to the westward until after a great many mishaps he came again at last on the $\frac{23\text{rd}}{12\text{th}}$ September to the house which he had built the year before on the Kolyma.

He proposed immediately to make a renewed attempt the following spring to reach his goal. But now his stores were exhausted, and the wearied crew refused to accompany him. In order to obtain funds for a new voyage he travelled to

Moscow, and by means of the assistance he succeeded in procuring there, he commenced in 1766 a voyage from which neither he nor any of his followers returned. COXE mentions several things which tell in favour of his having actually rounded Cape Deschnev and reached the Anadyr. But Wrangel believes that he perished in the neighbourhood of Cape Schelagskoj. For in 1823 the inhabitants of that cape showed Wrangel's companion Matiuschkin a little ruinous house, built east of the river Werkon on the coast of the Polar Sea. For many years back the Chukches travelling past had found there human bones gnawed by beasts of prey, and various household articles, which indicated that shipwrecked men had wintered there, and Wrangel accordingly supposes that it was there that Schalaurov perished a sacrifice to the determination with which he prosecuted his self-imposed task of sailing round the north-eastern promontory of Asia.[1]

In order to ascertain whether any truth lay at the bottom of the view, generally adopted in Siberia, that the continent of America extended along the north coast of Asia to the neighbourhood of the islands situated there, CHICHERIN, Governor of Siberia, in the winter of 1763 sent a sergeant, ANDREJEV with dog-sledges on an ice journey towards the north. He succeeded in reaching some islands of considerable extent, which Wrangel, who always shows himself very sceptical with respect to the existence of new lands and islands in the Polar Sea, considers to have been the Bear Islands. Now it appears to be pretty certain that Andrejev visited a south-westerly continuation of the land named on recent maps "Wrangel Land," which in that case, like the corresponding part of America, forms a collection of many

[1] An account of Schalaurov is given by Coxe (*Russian Discoveries*, &c., 1780, p. 323) and Wrangel (i. p. 73). That the hut seen by Matiuschkin actually belonged to Schalaurov appears to me highly improbable, for the traditions of the Siberian savages seldom extend sixty years back.

large and small islands. Andrejev found everywhere numerous proofs that the islands which he visited had been formerly inhabited. Among other things he saw a large hut built of wood without the help of iron tools. The logs were as it were gnawed with teeth (hewed with stone axes), and bound together with thongs.[1] Its position and construction indicated that the house had been built for defence; it had thus been found impossible in the desolate regions of the Polar Sea to avoid the discord and the strife which prevail in more southerly lands. To the east and north-east Andrejev thought he saw a distant land; he is also clearly the true European discoverer of Wrangel Land, provided we do not consider that even he had a predecessor in the Cossack, FEODOR TATARINOV, who according to the concluding words of Andrejev's journal appears to have previously visited the same islands. It is highly desirable that this journal, if still in existence, be published *in a completely unaltered form*. How important this is appears from the following paragraph in the instructions given to Billings:—"One Sergeant Andrejev saw from the last of the Bear Islands a large island to which they (Andrejev and his companions) travelled in dog-sledges. But they turned when they had gone twenty versts from the coast, because they saw fresh traces of a large number of men, who had travelled in sledges drawn by reindeer."[2]

In order to visit the large land in the north-east seen by Andrejev, there was sent out in the years 1769, 1770, and 1771 another expedition, consisting of the three surveyors, LEONTIEV, LUSSOV, and PUSCHKAREV, with dog-sledges over the ice to the north-east, but they succeeded neither in reaching the land in question, nor even ascertaining with certainty whether it actually existed or not. Among the natives, however, the belief in it

[1] Wrangel, i. p. 79.
[2] Sauer, *An Account*, &c., Appendix, p. 48.

was maintained very persistently, and they even knew how to give names to the tribes inhabiting it.

The New Siberian Islands, which previously had often been seen by travellers along the coast, were visited the first time in 1770 by LJACHOFF, who besides Ljachoff's island lying nearest the coast, also discovered the islands Maloj and Kotelnoj. On this account he obtained an exclusive right to collect mammoth tusks there, a branch of industry which since that time appears to have been carried on in these remote regions with no inconsiderable profit. The importance of the discovery led the government some years after to send thither a land surveyor, CHVOINOV,[1] by whom the islands were surveyed, and some further information obtained regarding the remarkable natural conditions in that region. According to Chvoinov the ground there consists at many places of a mixture of ice and sand with mammoth tusks, bones of a fossil species of ox, of the rhinoceros, &c. At many places one can literally roll off the carpet-like bed of moss from the ground, when it is found that the close, green vegetable covering has clear ice underlying it, a circumstance which I have also observed at several places in the Polar regions. The new islands were rich not only in ivory, but also in foxes with valuable skins, and other spoils of the chase of various kinds. They therefore formed for a time the goal of various hunters' expeditions. Among these hunters may be named SANNIKOV, who in 1805 discovered the islands Stolbovoj and Faddejev, SIROVATSKOJ, who in 1806 discovered Novaya Sibir, and BJELKOV, who in 1808 discovered the small islands named after him. In the meantime disputes arose about the hunting monopoly, especially after Bjelkov and others petitioned for permission to establish on Kotelnoj Island *a hunting and trading station.* (?)[2] This induced ROMANZOV, then

[1] Sauer, *loc. cit.* p. 103, according to an oral communication by Ljachoff's follower Protodiakonov.

[2] Compare Wrangel, i. p. 98.

Chancellor of Russia, to order once more these distant territories to be explored by HEDENSTRÖM,[1] a Siberian exile, who had formerly been secretary to some eminent man in St. Petersburg. He started in dog-sledges on the $\frac{19}{7}$th March, 1809, from Ustjansk going over the ice to Ljachoff's Island, and thence to Faddejev Island, where the expedition was divided into two parts. Hedenström continued his course to Novaya Sibir, the south coast of which he surveyed. Here he discovered among other things the remarkable "tree mountain," which I have before mentioned. His companions KOSCHEVIN and SANNIKOV explored Faddejev, Maloj and Ljachoff's Islands. On Faddejev, Sannikov found a Yukagir sledge, stone skin-scrapers, and an axe made of mammoth ivory, whence he drew the conclusion that the island was inhabited before the Russians introduced iron among the savage tribes of Siberia.

The explorations thus commenced were continued in 1810. The explorers started on the $\frac{14\text{th}}{2\text{nd}}$ March from the mouth of the Indigirka, and after eleven days' journey came to Novaya Sibir. It had been Hedenström's original intention to employ reindeer and horses in exploring the islands, but he afterwards abandoned this plan, fearing that he would not find pasture for his draught animals. Both Hedenström and Sannikov believed that they saw from the north coast of the island bluish mountains on the horizon in the north-east. In order to reach this new land the former undertook a journey over the ice. It was so uneven, however, that in four days he could only penetrate about seventy versts. Here on the $\frac{9\text{th April}}{28\text{th March}}$ he met with quite open water, which appeared to extend to the Bear Islands, *i.e.* for a distance

[1] Matthias Hedenström, Aulic Councillor, whose name indicates that he was of Swedish birth, died at the village Hajdukovo, seven versts from Tomsk, on the 2nd October (20th September), 1845, at the age of sixty-five. Biographical notes regarding Hedenström are to be found in the Calendar for the Irkutsh government for the year 1865, pp. 57-60; I have not, however, succeeded in procuring this work, or in finding any other notices of Hedenström's birthplace and life.

of about 500 versts. He therefore turned southward, and reached the mainland after forty-three days' very difficult travelling over the ice. During the journey Hedenström was saved from famine by his success in killing eleven Polar bears. A new attempt, which he made the same spring to reach with dog-sledges the unknown land in the north-east, was also without result in consequence of his meeting with broad, impassable "leads" and openings in the ice, but even on this occasion he believed that he found many indications of the existence of an extensive land in the direction named. It was only with great difficulty that on the $\frac{20}{8}$th May he succeeded in reaching the mainland at Cape Baranov over very weak ice.

The same year Sannikov explored Kotelnoj Island, where he fell in with Bjelkov and several hunters, who had settled for the summer on the west coast of the island to collect mammoth tusks and hunt foxes there. He found also a Greek cross erected on the beach and the remains of a vessel, which, to judge from its construction and the hunting implements scattered about in the neighbourhood, appeared to have belonged to an Archangel hunter, who had been driven by wind or ice from Spitzbergen or Novaya Zemlya.

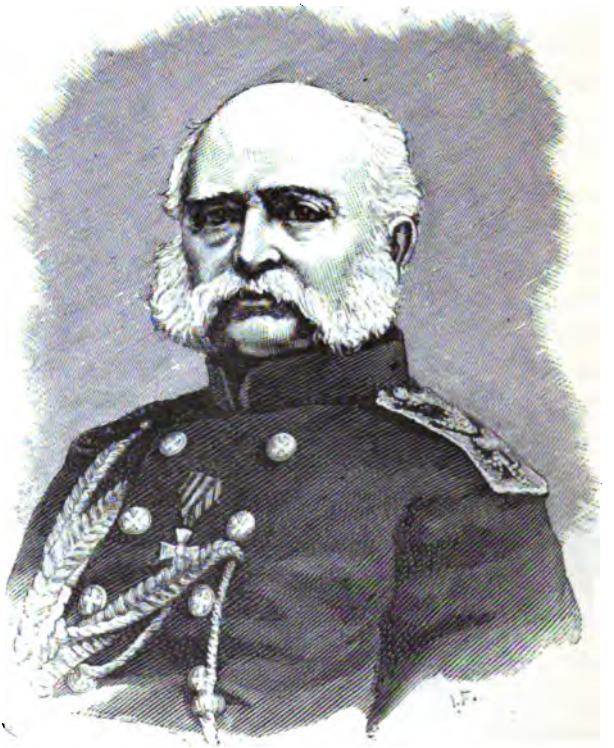
Next summer "the Hedenström expeditions" were concluded with the survey of the north coast of Novaya Sibir by CHENIZYN, and by a repetition of the attempt to penetrate from Cape Kamennoj over the ice in a north-easterly direction, this time carried out by the Cossack TATARINOV, and finally by a renewed exploration of Faddejev Island by Sannikov. Tatarinov found the ice, probably in the end of March, so thin, that he did not dare to proceed farther, and beyond the thin ice the sea was seen to be quite open. Sannikov first explored Faddejev Island. He thought he saw from the hills of the island a high land in the north-east, but when he attempted to reach it over the ice, he came upon open water twenty-five versts from land. He therefore returned the same spring to Ustjansk in order there to

equip a caravan consisting of twenty-three reindeer, which started on the $\frac{14th}{2nd}$ May to go over the ice to Kotelnoj Island, which could be reached only with great difficulty in consequence of "leads" in the ice and the large quantity of salt water which had accumulated upon it. The reindeer were exceedingly enfeebled, but recovered rapidly on reaching land, so that

PETER FEODOROVITSCH ANJOU.
Born in 1798 in Russia, died in 1869 in St. Petersburg.

Sannikov was able under specially favourable circumstances to make a large number of interesting excursions, among others one across the island. He stated that on the heights in the interior of it there were found skulls and bones of horses, oxen, "buffaloes" (Ovibos?) and sheep in so large numbers, that

it was evident that whole herds of graminivora had lived there in former times. Mammoth bones were also found everywhere on the island, whence Sannikov drew the conclusions, that all these animals had lived at the same time, and that since then the climate had considerably deteriorated. These suppositions he



FERDINAND VON WRANGEL.
Born in 1796 at Pskov, died in 1870 at Dorpat.

considered to be further confirmed by the fact that large, partially petrified tree-stems were found scattered about on the island in still greater numbers than on Novaya Sibir.[1] Besides

[1] A very remarkable geological fact is the number of tree-stems in all stages of decay and petrifaction, which are embedded in the rocks and

he found here everywhere remains of old "Yukagir dwellings"; the island had thus once been inhabited. After Sannikov had fetched Chenitzyn from Faddejev Island, where he had passed the summer in great want of provisions, and ordered him, who was probably a greater adept at the pen, to draw up a report of his own interesting researches, he commenced his return journey on the $\frac{8\text{th Nov.}}{27\text{th Oct.}}$ and arrived at Ustjansk on the $\frac{24}{12}$th November.

It may be said that through Hedenström's and Sannikov's exceedingly remarkable Polar journeys, the titles have been written of many important chapters in the history of the former and recent condition of our globe. But the inquirer has hitherto waited in vain for these chapters being completed through new researches carried out with improved appliances. For since then the New Siberian Islands have not been visited by any scientific expedition. Only in 1823 ANJOU, lieutenant in the Russian Navy, with the surgeon FIGURIN, and the mate ILGIN, made a new attempt to penetrate over the ice to the supposed lands in the north and north-east, but without success. Similar attempts were made at the same time from the Siberian mainland by another Russian naval officer, FERDINAND VON WRANGEL, accompanied by Dr. KÜBER, midshipman MATIUSCHKIN, and mate KOSMIN. They too were unsuccessful in penetrating over the ice far from the coast. Wrangel returned fully convinced that all the accounts which were current in Siberia of the land he wished to visit, and which now bears the name of Wrangel Land, were based on legends, mistake, and intentional untruths. But Anjou and Wrangel did an important service to Polar

earthy strata of Siberia, having their origin all along from the Jurassic age till now. It appears as if Siberia, during the whole of this immense period of time, has not been subjected to any great changes in a purely geographical respect, whereas in Europe there have been innumerable alternations of sea and land, and alps have been formed and disappeared. The Siberians call the tree-stems found on the *tundra* far from the sea and rivers *Adam's wood*, to distinguish them from more recent sub-fossil trees, which they call *Noah's wood*.

research by showing that the sea, even in the neighbourhood of the Pole of cold, is not covered with any strong and continuous sheet of ice, even at that season of the year when cold reaches its maximum. By the attempts made nearly at the same time by Wrangel and Parry to penetrate farther northwards, the one from the north coasts of Siberia, and the other from those of Spitzbergen, Polar travellers for the first time got a correct idea how uneven and impassable ice is on a frozen sea, how little the way over such a sea resembles the even polished surface of a frozen lake, over which we dwellers in the north are accustomed to speed along almost with the velocity of the wind. Wrangel's narrative at the same time forms an important source of knowledge both of preceding journeys and of the recent natural conditions on the north coast of Asia, as is only too evident from the frequent occasions on which I have quoted his work in my sketch of the voyage of the *Vega*.

It remains for me now to enumerate some voyages from Behring's Straits westward into the Siberian Polar Sea.

1778 *and* 1779.—During the third of his famous circumnavigations of the globe JAMES COOK penetrated through Behring's Straits into the Polar Sea, and then along the north-east coast of Asia westwards to Irkaipij, called by him Cape North. Thus the honour of having carried the first seagoing vessel to this sea also belongs to the great navigator. He besides confirmed Behring's determination of the position of the East Cape of Asia, and himself determined the position of the opposite coast of America.[1] The same voyage was

[1] The first European who visited the part of America lying right opposite to Asia was Schestakov's companion, the surveyor Gvosdev. He crossed Behring's Straits to the American side as early as 1730 (*Müller*, iii. p. 131), and therefore ought properly to be considered as the discoverer of this sound. The north-westernmost part of America, Behring's Straits and the islands situated in it, are besides shown in Strahlenberg's map, which was made at least a decade before Gvosdev's voyage. There north-western America is delineated as a large island, inhabited by a tribe, the *Pucho-*

approximately repeated the year after Cook's death by his successor CHARLES CLARKE, but without any new discoveries being made in the region in question.

1785–94.—The success which attended Cook in his exploratory voyages and the information, unlooked for even by the Russian government, which Coxe's work gave concerning the voyages of the Russian hunters in the North Pacific, led to the equipment of a grand new expedition, having for its object the further exploration of the sea which bounds the great Russian Empire on the north and east. The plan was drawn up by Pallas and Coxe, and the carrying out of it was entrusted to an English naval officer in the Russian service, J. BILLINGS, who had taken part in Cook's last voyage. Among the many others who were members of the expedition, may be mentioned Dr. MERK, Dr. ROBECK, the secretary MARTIN SAUER, and the Captains HALL, SARYTCHEV, and BEHRING the younger, in all more than a hundred persons. The expedition was fitted out on a very large scale, but in consequence of Billings' unfitness for having the command of such an expedition the result by no means corresponded to what might reasonably have been expected. The expedition made an inconsiderable excursion into the Polar

chotski, who lived in a constant state of warfare with the *Giuchieghi*, who inhabited the islands in the sound. Wrangel Land is also shown in this remarkable map. In 1767, eleven years before Cook's voyage in the Polar Sea, the American side of Behring's Straits was also visited by Lieut. SYND with a Russian expedition, that started from Okotsk in 1764. In the short account of the voyage which is to be found in William Coxe's *Account of the Russian Discoveries*, &c., London, 1780, p. 300, it is said expressly that Synd considered the coast on which he landed to belong to America. On Synd's map, published by Coxe, the north part of the Behring Sea is enriched with a number of fictitious islands (St. Agaphonis, St. Myronis, St. Titi, St. Samuelis, and St. Andreæ). As Synd, according to Sarytchev in the work quoted below, p. 11, made the voyage in a boat, it is probable that by these names islands were indicated which lay quite close to the coast and were not so far from land as shown in the map; besides, the mountain-summits on St. Lawrence Island, which are separated by extensive low lands, may perhaps have been taken for separate islands.

Sea from the $\frac{20}{10}$th June to the $\frac{9\text{th Aug.}}{29\text{th July,}}$ 1787, and in 1791 Billings sailed up to St. Lawrence Bay, from which he went over land with eleven men to Yakutsk. The rest of this lengthened expedition does not concern the regions now in question.[1]

Among voyages during the century it remains to give account of those which have been made by OTTO VON KOTZEBUE, who during his famous circumnavigation of the globe in 1815–18, among other things also passed through Behring's Straits and discovered the strata, remarkable in a geological point of view, at Eschscholz Bay; LÜTKE, who during his circumnavigation of the globe in 1826–29, visited the islands and sound in the neighbourhood of Chukotskoj-nos; MOORE, who wintered at Chukotskoj-nos in 1848–49, and gave us much interesting information as to the mode of life of the Namollos and Chukches; KELLET, who in 1849 discovered Kellet Land and Herald Island on the coast of Wrangel Land; JOHN RODGERS, who in 1855 carried out for the American government much important hydrographical work in the seas on both sides of Behring's Straits; DALLMANN, who during a trading voyage in the Behring Sea landed at various points on Wrangel Land; LONG, who in 1867, as captain of the whaling barque *Nile*, discovered the sound between Wrangel Land and the mainland (Long Sound) and penetrated from Behring's Straits westwards farther than

[1] Billings' voyage is described in Martin Sauer's *Account of a Geographical and Astronomical Expedition to the Northern Parts of Asia, &c., by Commodore Joseph Billings*, London, 1802, and Gavrila Sarychev's *Achtjährige Reise im nördlichen Siberien, auf dem Eismeere und dem nordöstlichen Ocean. Aus dem Russischen übersetzt von J. H. Busse*, Leipzig, 1805-1806. As interesting to our Swedish readers it may be mentioned that the Russian hunter Prybilov informed Sauer that a Swedish brigantine, *Merkur*, coppered, carrying sixteen cannon, commanded by J. H. Coxe, in 1788, cruised in the Behring Sea in order to destroy the Russian settlements there. They however, according to Prybilov's statement to Sauer, "did no damage, because they saw that we had nothing worth taking away. They instead gave us gifts, because they were ashamed to offer violence to such poor fellows as we" (Sauer, p. 213).

any of his predecessors; DALL, who, at the same time that we are indebted to him for many important contributions to the knowledge of the natural conditions of the Behring Sea, also anew examined the ice-strata at Eschscholz Bay, and many others—but as the historical part of the sketch of the voyage of the *Vega* has already occupied more space than was calculated upon, I consider myself compelled with respect to the voyages of these explorers to refer to the numerous and for the most part accessible writings which have already been published regarding them.[1]

Was the *Vega* actually the first, and is she at the moment when this is being written, the only vessel that has sailed from the Atlantic by the north to the Pacific? As follows from the above narrative, this question may perhaps be answered with considerable certainty in the affirmative, as it may also with truth be maintained that no vessel has gone the opposite way

[1] Otto von Kotzebue, *Entdeckungs-Reise in die Süd-See und nach der Behrings Strasse*, Weimar, 1821 (Part III., Contributions in Natural History, by Adelbert von Chamisso).—Louis Choris, *Voyage pittoresque autour du monde*, Paris, 1822.

Frédérik Lütké, *Voyage autour du monde*, Paris, 1835-36.—F. H. von Kittlitz, *Denkwürdigkeiten einer Reise nach dem russischen Amerika, nach Mikronesien und durch Kamtschatka*, Gotha, 1858.

Kellet, *Voyage of H.M.S. "Herald,"* 1845-51, London, 1853 (Discovery of Herald Island and the east coast of Wrangel Land).

W. H. Hooper, *Ten Months among the Tents of the Tuski*, London, 1853 (Moore's wintering at Chukotskoj-nos).

John Rodgers, Behring's Sea and Arctic Ocean, from Surveys of the North Pacific Surveying Expedition, 1855 (only charts).—W. Heine, *Die Expedition in die Seen von China, Japan und Ochotsk, unter Commando von Commodore Colin Ringgold und Commodore John Rodgers*, Leipzig, 1858 (the expedition arrived at the result that Wrangel Land did not exist).

(Lindemann) *Wrangels Land im Jahre* 1866, *durch Kapiten Dallmann besucht* (*Deutsche Geograph. Blätter*, B. iv. p. 54, 1881).

Petermann, *Entdeckung eines neuen Polar-Landes durch den amerikan, Capt. Long*, 1867 (Mittheil. 1868, p. 1).—*Das neu-entdeckte Polar-Land*, &c. (Mittheil. 1869, p. 26).

from the Pacific to the Atlantic.[1] But the fictitious literature of geography at all events comprehends accounts of various voyages between those seas by the north passage, and I consider myself obliged briefly to enumerate them.

The first is said to have been made as early as 1555 by a Portuguese, MARTIN CHACKE, who affirmed that he had been parted from his companions by a west wind, and had been driven forward between various islands to the entrance of a sound which ran north of America in 59° N.L.; finally that he had come S.W. of Iceland, and thence sailed to Lisbon, arriving there before his companions, who took the "common way," *i.e.* south of Africa. In 1579 an English pilot certified that he had read in Lisbon in 1567 a printed account of this voyage, which however he could not procure afterwards because all the copies had been destroyed by order of the king, who considered that such a discovery would have an injurious effect on the Indian trade of Portugal (*Purchas*, iii. p. 849). We now know that there is land where Chacke's channel was said to be situated, and it is also certain that the sound between the continent of America and the Franklin archipelago lying much farther to the north was already in the sixteenth century too much filled with ice for its being possible that an account of meeting with ice could be omitted from a true sketch of a voyage along the north coast of America.

In 1588 a still more remarkable voyage was said to have been made by the Portuguese, LORENZO FERRER MALDONADO. He is believed to have been a cosmographer who among other things concerned himself with the still unsolved problem of making a

[1] It ought to be remembered that the voyage of the distinguished Arctic explorer, McClure, carried out with so much gallantry and admirable perseverance, from the Pacific to the Atlantic along the north coast of America, took place to no inconsiderable extent *by sledge journeys over the ice*, and that no English vessel has ever sailed by this route from the one sea to the other. The North-west Passage has thus never been accomplished by a vessel.

compass free from variation, and with the question, very difficult in his time, of finding a method of determining the longitude at sea (see the work of AMORETTI quoted below, p. 38). Of his imaginary voyage he has written a long narrative, of which a *Spanish* copy with some drawings and maps was found in a library at Milan. The narrative was published in Italian and French translations by the superintendent of the library, Chevalier CARLO AMORETTI,[1] who besides added to the work a number of his own learned notes, which however do not give evidence of experience in Arctic waters. The same narrative has since been published in English by J. BARROW (*A Chronological History of Voyages into the Arctic Regions*, &c., London, 1818. App. p. 24.) The greater part of Maldonado's report consists of a detailed plan as to the way in which the new sea route would be used and fortified by the Spanish-Portuguese government.[2] The voyage itself is referred to merely in passing. Maldonado says that in the beginning of March he sailed from Newfoundland along the north coast of America in a westward direction. Cold, storm, and darkness, were at first very inconvenient for navigation, but at all events he reached without difficulty "Anian Sound," which separates Asia from America. This is described in detail. Here various ships were met with prepared to sail through the sound, laden with Chinese goods. The crews appeared to be Russian or Hanseatic. Conversation was carried on with them in Latin. They stated that they came from a very large town, situated a little more than a hundred leagues from the sound. In the middle of June Maldonado returned by the way he came to the Atlantic, and on this occasion too the voyage was performed without the least difficulty. The heat at sea during the return journey was as great as when it is greatest in Spain, and

[1] Amoretti, *Viaggio del mare Atlantico al Pasifico per la via del Nord-Ovest*, &c. *Fatto del capitano Lorenzo Ferrer Maldonado, l'anno* MDLXXXVIII. Milano, 1811.

[2] At the date of Maldonado's voyage Spain and Portugal were united.

meeting with ice is not mentioned. The banks of the river which falls into the haven at Anian Sound (according to Amoretti, identical with Behring's Straits) were overgrown with very large trees, bearing fruit all the year round: among the animals met with in the regions seals are mentioned, but also two kinds of swine, buffaloes, &c. All these absurdities show that the whole narrative of the voyage was fictitious, having been probably written with the view of thereby giving more weight to the proposal to send out a north-west expedition from Portugal, and in the full belief that the supposed sound actually existed, and that the voyage along the north coast of America would be as easy of accomplishment as one across the North Sea.[1] The way in which the icing down of a vessel is described indicates that the narrator himself or his informant had been exposed to a winter storm in some northern sea, probably at Newfoundland, and the spirited sketch of the sound appears to have been borrowed from some East Indian traveller, who had been driven by storm to northern Japan, and who in a channel between the islands in that region believed that he had discovered the fabulous Anian Sound.

Of a third voyage in 1660 a naval officer named DE LA MADELÈNE gave in 1701 the following short account, probably picked up in Holland or Portugal, to Count DE PONTCHARTRIN: "The Portuguese, DAVID MELGUER, started from Japan on the 14th March, 1660, with the vessel *le Père éternel*, and following the coast of Tartary, *i.e.* the east coast of Asia, he first sailed

[1] The narratives of the Russian voyagers in the Polar Seas bear a quite different stamp. Details are seldom wanting in these, and they correspond with known facts, and the discoveries made are of reasonably modest dimensions. I therefore consider, as I have said already, that the doubts of the trustworthiness of Deschnev, Chelyuskin, Andrejev, Hedenström, Sannikov, &c., are completely unfounded, and it is highly desirable that all journals of Russian explorers in the Polar Sea yet in existence be published as soon as possible, and not in a mutilated shape, but in a complete and unaltered form.

north to 84° N.L. Thence he shaped his course between Spitzbergen and Greenland, and passing west of Scotland and Ireland came again to Oporto in Portugal." M. de la Madelène's narrative is to be found reproduced in M. BUACHE'S excellent geographical paper "Sur les différentes idées qú'on a eues de la traversée de la Mère Glaciale arctique et sur les communications ou jonctions qu'on a supposées entre diverses rivières" (*Histoire de l'Académie, Année 1754*, Paris, 1759, *Memoires*, p. 12). The paper is accompanied by a Polar map constructed by Buache himself, which, though the voyage which led to its construction was clearly fictitious, and though it also contains many other errors—for instance, the statement that the Dutch penetrated in 1670 to the north part of Taimur Land—is yet very valuable and interesting as a specimen of what a learned and critical geographer knew in 1754 about the Polar regions. That Melguer's voyage is fictitious is shown partly by the ease with which he is said to have gone from the one sea to the other, partly by the fact that *the only detail* which is to be found in his narrative, viz. the statement that the coast of Tartary extends to 84° N.L., is incorrect.

All these and various other similar accounts of north-east, north-west, or Polar passages achieved by vessels in former times have this in common, that navigation from the one ocean to the other across the Polar Sea is said to have gone on as easily as drawing a line on the map, that meeting with ice and northern animals of the chase is never spoken of, and finally that every particular which is noted is in conflict with the known geographical, climatal, and natural conditions of the Arctic seas. All these narratives therefore can be proved to be fictitious, and to have been invented by persons who never made any voyages in the true Polar Seas.

The *Vega* is thus the first vessel that has penetrated by the north from one of the great world-oceans to the other.

CHAPTER XIV.

Passage through Behring's Straits—Arrival at Nunamo—Scarce species of seal—Rich vegetation—Passage to America—State of the ice—Port Clarence—The Eskimo—Return to Asia—Konyam Bay—Natural conditions there—The ice breaks up in the interior of Konyam Bay—St. Lawrence Island—Preceding visits to the Island—Departure to Behring Island.

AFTER we had passed the easternmost promontory of Asia, the course was shaped first to St. Lawrence Bay, a not inconsiderable fjord, which indents the Chukch peninsula a little south of the smallest part of Behring's Straits. It was my intention to anchor in this fjord as long as possible, in order to give the naturalists of the *Vega* expedition an opportunity of making acquaintance with the natural conditions of a part of Chukch Land which is more favoured by nature than the bare stretch of coast completely open to the winds of the Polar Sea, which we hitherto had visited. I would willingly have stayed first for some hours at Diomede Island, the market-place famed among the Polar tribes, situated in the narrowest part of the Straits, nearly half-way between Asia and America, and probably before the time of Columbus a station for traffic between the Old and the New Worlds. But such a delay would have been attended with too great difficulty and loss of time in consequence of the dense fog which prevailed here on the boundary between the warm sea free from drift-ice and the cold sea filled with drift-ice.

Even the high mountains on the Asiatic shore were still wrapped in a thick mist, from which only single mountain-summits now and then appeared. Next the vessel large fields of drift-ice were visible, on which here and there flocks of a beautifully marked species of seal (*Histriophoca fasciata*, Zimm.) had settled. Between the pieces of ice sea-birds swarmed, mostly belonging to other species than those which

SEAL FROM THE BEHRING SEA.
Histriophoca fasciata, Zimm.

are met with in the European Polar seas. The ice was fortunately so broken up that the *Vega* could steam forward at full speed to the neighbourhood of St. Lawrence Bay, where the coast was surrounded by some more compact belts of ice, which however were broken through with ease. First, in the mouth of the fjord itself impenetrable ice was met with, completely blocking the splendid haven of St. Lawrence Bay. The *Vega*

was, therefore, compelled to anchor in the open road off the village Nunamo. But even here extensive ice-fields, though thin and rotten, drifted about; and long, but narrow, belts of ice passed the vessel in so large masses that it was not advisable to remain longer at the place. Our stay there was therefore confined to a few hours.

During the course of the winter Lieutenant Nordquist endeavoured to collect from the Chukches travelling past as complete information as possible regarding the Chukch villages or encampments which are found along the coast between Chaun Bay and Behring's Straits. His informants always finished their list with the village Ertryn, situated west of Cape Deschnev, explaining that farther east and south there lived another tribe, with whom they indeed did not stand in open enmity, but who, however, were not to be fully depended upon, and to whose villages they therefore did not dare to accompany any of us.[1] This statement also corresponds, as perhaps follows from what I have pointed out in the preceding chapter, with the accounts commonly found in books on the ethnography of this region. While we steamed forward cautiously in a dense fog in the neighbourhood of Cape Deschnev, twenty to thirty natives came rowing in a large skin boat to the vessel. Eager to make acquaintance with a tribe new to us, we received them with pleasure. But when they climbed over the side we found that they were pure

[1] The enmity appeared, however, to be of a very passive nature and by no means depending on any tribal dislike, but only arising from the inhabitants of the villages lying farthest eastward being known to be of a quarrelsome disposition and having the same reputation for love of fighting as the peasant youths in some villages in Sweden. For Lieut. Hooper, who during the winter 1848-9 made a journey in dog-sledges from Chukotskoj-nos along the coast towards Behring's Straits says that the inhabitants at Cape Deschnev itself enjoyed the same bad reputation among their Namollo neighbours to the south as among the Chukches living to the westward. "They spoke another language." Possibly they were pure Eskimo.

Chukches, some of them old acquaintances, who during winter had been guests on board the *Vega*. "Ankali" said they, with evident contempt, are first met with farther beyond St. Lawrence Bay. When we anchored next day at the mouth of this bay we were immediately, as usual, visited by a large number of natives, and ourselves visited their tents on land. They still talked Chukch with a limited mixture of foreign words, lived in tents of a construction differing somewhat from the Chukches', and appeared to have a somewhat different cast of countenance. They themselves would not allow that there was any national difference between them and the old warrior and conqueror tribe on the north coast, but stated that the race about which we inquired were settled immediately to the south. Some days after we anchored in Konyam Bay (64° 49′ N.L., 172° 53′ W.L. from Greenwich). We found there only pure reindeer-owning Chukches; there was no coast population living by hunting and fishing. On the other hand, the inhabitants near our anchorage off St. Lawrence Island consisted of Eskimo and Namollo. It thus appears as if a great part of the Eskimo who inhabit the Asiatic side of Behring's Straits, had during recent times lost their own nationality and become fused with the Chukches. For it is certain that no violent expulsion has recently taken place here. It ought besides to be remarked that the name *Onkilon* which Wrangel heard given to the old coast population driven out by the Chukches is evidently nearly allied to the word *Ankali*, with which the reindeer-Chukch at present distinguishes the coast-Chukch, also that, in the oldest Russian accounts of Schestakov's and Paulutski's campaigns in these regions, there never is any mention of two different tribes living here. It is indeed mentioned in these accounts that among the slain Chukches there were found some men with perforated lips, but probably these were Eskimo from the other side of Behring's Straits, previously taken prisoners by

the Chukches, or perhaps merely Eskimo who had been paying a friendly visit to the Chukches and who had taken part as volunteers in their war of freedom. It therefore appears to me to be on the whole more probable that the Eskimo have migrated from America to Asia, than that, as some authors have supposed, this tribe has entered America from the west by Behring's Straits or Wrangel Land.

The tent-village Nunamo, or, as Hooper writes, "Noonahmone," does not lie low, like the Chukch villages we had formerly seen, on the sea-shore, but pretty high up on a cape between the sea and a river which debouches immediately to the south-west of the village, and now during the snow-melting season was much flooded. At a short distance from the coast the land was occupied by a very high chain of mountains, which was split up into a number of summits and whose sides were formed of immense stone mounds distributed in terraces. Here a large number of marmots and lagomys had their haunt. The lagomys, a species of rodent that does not occur in Sweden, of the size of a large rat, is remarkable for the care with which in summer it collects great stores for the winter. The village consisted of ten tents built without order on the first high strand bank. The tents differed somewhat in construction from the common Chukch tents, and as drift-wood appears to be met with on the beach only in limited quantity, whale-bones had been used on a very large scale in the frame of the tent. Thus, for instance, the tent-covering of seal-skin was stretched downwards over the ribs or lower jawbones of the whale which were fixed in the ground like poles. These were united above with slips of whale-bones, from which other slips of the same sort of bones or of whale-bone rose to the summit of the tent, and finally, to prevent the blast from raising the tent-covering from the ground, its border was loaded with masses of large heavy bones. Eleven shoulder-blades of the whale were thus used round a single

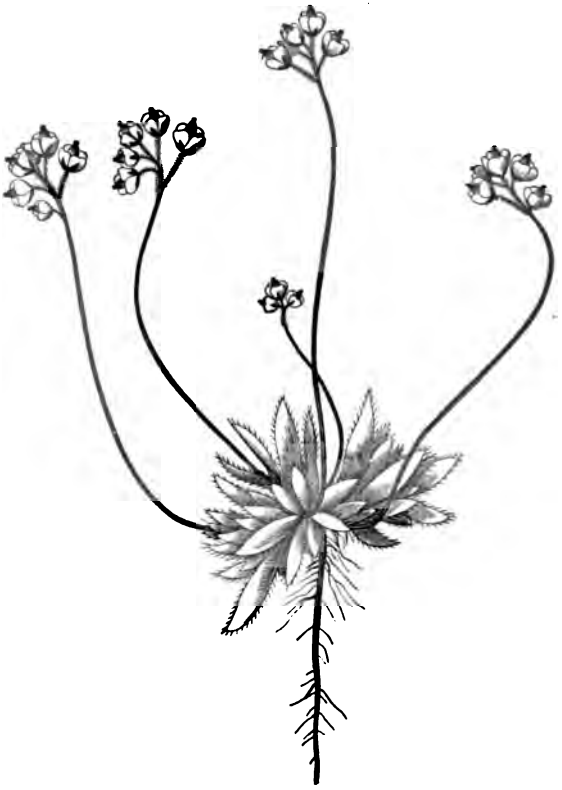
tent. In the absence of drift-wood, whale and seal bones drenched in train-oil are also used as fuel in cooking in the open air during summer; a large curved whale rib was placed over the fire-place to serve as a pot-holder; the vertebræ of the whale were used as mortars; the entrances to the blubber-cellars were closed with shoulder-blades of the whale; hollowed whale-bones were used as lamps; slices of whale-bone or pieces of the under-jaw and the straighter ribs were used for shoeing the sledges, for spades and ice-mattocks, the different parts of the implement being bound together with whale-bone fibres, &c.[1]

Masses of black seal-flesh, and long, white, fluttering strings of inflated intestines, were hung up between the tents, and in their interior there were everywhere to be seen bloody pieces of flesh, prepared in a disgusting way or lying scattered about, whereby both the dwellings and their inhabitants, who were occupied with hunting, had a more than usually disagreeble appearance. A pleasant interruption was formed by the heaps of green willow branches which were placed at the entrance of nearly every tent, commonly surrounded by women and children, who ate the leaves with delight. At some places whole sacks of Rhodiola and various other plants had been collected for food during winter. As distinctive of the Chukches here it may be mentioned in the last place that they were abundantly provided with European household articles, among them *Remington guns*, and that none of them asked for spirits.

Most of the seals which were seen in the tents were the common *Phoca hispida*, but along with them we found several skins of

[1] There is still in existence a sketch of a tribe, living far to the south on the coast of the Indian Sea, who at the time of Alexander the Great used the bones of the whale in a similar way. "They build their houses so that the richest among them take bones of the whale, which the sea casts up, and use them as beams; of the larger bones they make their doors. Arrian, *Historia Indica*, XXIX. and XXX.

Histriophoca fasciata, Zimm., and I even succeeded, though with great difficulty, in inducing the Chukches to part with the skin and skull of this uncommon species, distinguished by its peculiar marking. The natives appeared to set a special value on its skin, and parted with it unwillingly. We had



DRABA ALPINA L., FROM ST. LAWRENCE BAY.
Natural size.

ourselves, as I have already stated, seen during our passage from Behring's Straits a number of these seals on the ice-floes drifting south, but the limited time at our disposal did not permit us to hunt them.

When we left Pitlekaj, vegetation there was still far from having reached its full development, but at Nunamo the strand-bank was gay with an exceedingly rich magnificence of colour. On an area of a few acres Dr. Kjellman collected here more than a hundred species of flowering plants, among which were a considerable number that he had not before seen on the Chukch Peninsula. Space does not permit me to give another list of plants, but in order that the reader may have an idea of the great difference in the mode of growth which the same species may exhibit under the influence of different climatal conditions, I give here a drawing of the Alpine whitlow grass (*Draba alpina*, L.) from St. Lawrence Bay. It would not, perhaps, be easy to recognise in this drawing the species delineated on page 341 of vol. i.; the globular form which the plant assumed on the shore of Cape Chelyuskin exposed to the winds of the Polar Sea, has here, in a region protected from them, completely disappeared.

At the rocky headlands there were still, however, considerable snowdrifts, and from the heights we could see that considerable masses of ice were still drifting along the Asiatic side of Behring's Straits. During an excursion to the top of one of the neighbouring mountains, Dr. Stuxberg found the corpse of a native laid out on a stone-setting of the form common among the Chukches. Alongside the dead man lay a broken percussion gun, spear, arrows, tinder-box, pipe, snow-shade, ice-sieve, and various other things which the departed was considered to be in want of in the part of the Elysian fields set apart for Chukches. The corpse had lain on the place at least since the preceding summer, but the pipe was one of the clay pipes that I had caused to be distributed among the natives. It had thus been placed there long after the proper burial.

Anxious as I was to send off soon from a telegraph station some re-assuring lines to the home-land, because I feared that a general uneasiness had already begun to be felt for the fate of

the *Vega*, I would willingly have remained at this place, so important and interesting in a scientific point of view, at least for some days, had not the ice-belts and ice-fields drifting about in the offing been so considerable that if a wind blowing on land had risen unexpectedly, they might readily have been dangerous to our vessel, which even now was anchored in a completely open road, for the splendid haven situated farther in in St. Lawrence Bay was still covered with ice, and consequently inaccessible. On the afternoon of 21st July, accordingly, when all were assembled on board pleased and delighted with the results of the morning visit to land, I ordered the anchor to be weighed that the *Vega* might steam across to the American side of Behring's Straits. As in all the Polar seas of the northern hemisphere, so also here, the eastern side of the Straits was ice-bestrewn, the western, on the other hand, clear of ice. The passage was at all events a rapid one, so that by the afternoon of the 21st July we were able to anchor in Port Clarence, an excellent haven south of the westernmost promontory of Asia, Cape Prince of Wales. *It was the first time the Vega anchored in a proper haven, since on the 18th August 1878 she left Actinia Haven on Taimur Island.* During the intermediate time she had been constantly anchored or moored in open roads without the least land shelter from sea, wind, and drift-ice. The vessel was, however, thanks to Captain Palander's judgment and thoughtfulness, and the ability of the officers and crew, still not only quite free from damage, but even as seaworthy as when she left the dock at Karlskrona, and we had still on board provisions for nearly a year, and about 4,000 cubic feet of coal.

Towards the sea Port Clarence is protected by a long low sandy reef, between the north end of which and the land there is a convenient and deep entrance. There a considerable river falls into the interior of the harbour, the mouth of which widens to a lake, which is separated from the outer harbour by a sandy neck of land. This lake also forms a good and spacious harbour,

but its entrance is too shallow for vessels of any considerable draught. The river itself, on the contrary, is deep, and about eighteen kilometres from its mouth flows through another lake, from the eastern shore of which rugged and shattered mountains rise to a height which I estimate at 800 to 1000 metres; but it is quite possible that their height is twice as great, for in making such estimates one is liable to fall into error. South of the river and the harbour the land rises abruptly from the river bank, which is from ten to twenty metres high. On the north side, on the other hand, the bank is for the most part low, but farther into the interior the ground rises rapidly to rounded hills from 300 to 400 metres high. Only in the valleys and at other places where very large masses of snow had collected during the winter, were snow-drifts still to be seen. On the other hand, we saw no glaciers, though we might have expected to find them on the sides of the high mountains which bound the inner lake on the east. It was also clear that during the recent ages no widely extended ice-sheet was to be found here, for in the many excursions we made in different directions, among others up the river to the lake just mentioned, we saw nowhere any moraines, erratic blocks, striated rock-surfaces, or other traces of a past ice-age. Many signs, on the other hand, indicate that during a not very remote geological period glaciers covered considerable areas of the opposite American shore, and contributed to excavate the fjords there—Kolyutschin Bay, St. Lawrence Bay, Metschigme Bay, Konyam Bay, &c.

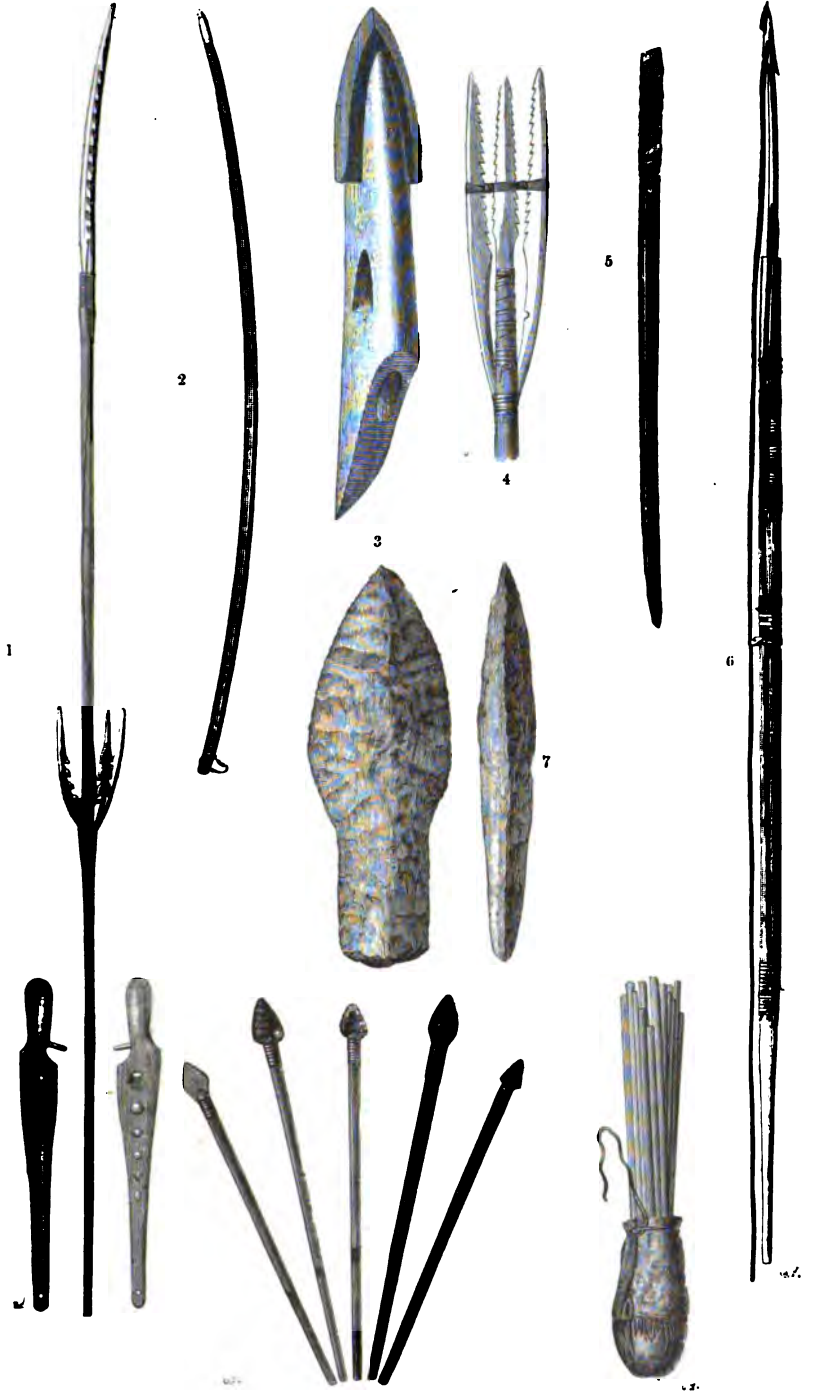
When we appoached the American side we could see that the shore cliffs were formed of stratified rocks. I therefore hoped to be able, at last, to make a rich collection of fossils, something that I had no opportunity of doing during the preceding part of the voyage. But I found, on reaching them, that the stratified rocks only consisted of crystalline schists without any traces of animal or vegetable remains. Nor did we find on the shore any whale-bones or any of the remarkable mammoth-bearing

ice-strata which were discovered in the bay situated immediately north of Behring's Straits, which was named after Dr. ESCHSCHOLZ, medical officer during Kotzebue's famous voyage.[1]

Immediately after the anchor fell we were visited by several very large skin boats and a large number of *kayaks*. The latter were larger than the Greenlanders', being commonly intended for two persons, who sat back to back in the middle of the craft. We even saw boats from which, when the two rowers had stepped out, a third person crept who had lain almost hermetically sealed in the interior of the *kayak*, stretched on the bottom without the possibility of moving his limbs, or saving himself if any accident should happen. It appeared to be specially common for children to accompany their elders in *kayak* voyages in this inconvenient way.

After the natives came on board a lively traffic commenced, whereby I acquired some arrow-points and stone fishing-hooks. Anxious to procure as abundant material as possible for

[1] These strata were discovered during Kotzebue's circumnavigation of the globe (*Entdeckungs Reise*, Weimar, 1821, i. p. 146, and ii. p. 170). The strand-bank was covered by an exceedingly luxuriant vegetable carpet, and rose to a height of eighty feet above the sea. Here the "rock," if this word can be used for a stratum of ice, was found to consist of pure ice, covered with a layer, only six inches thick, of blue clay and turf-earth. The ice must have been several hundred thousand years old, for on its being melted a large number of bones and tusks of the mammoth appeared, from which we may draw the conclusion that the ice-stratum was formed during the period in which the mammoth lived in these regions. This remarkable observation has been to a certain extent disputed by later travellers, but its correctness has recently been fully confirmed by Dall. On the other hand, the extent to which the strong odour, which was observed at the place and resembled that of burned horns, arose from the decaying mammoth remains, is perhaps uncertain. Kotzebue fixed the latitude of the place at 66° 15′ 36″. During Beechey's voyage in 1827 the place was thoroughly examined by Mr. Collie, the medical officer of the expedition. He brought home thence a large number of the bones of the mammoth, ox, musk-ox, reindeer, and horse, which were described by the famous geologist Buckland (F. W. Beechey, *Narrative of a Voyage to the Pacific and Behring's Straits, 1825-28*. London, 1831, ii. Appendix).



HUNTING IMPLEMENTS AT PORT CLARENCE.

1. Bird-dart with wooden handle for throwing, one-ninth of the natural size. 2. Whale-harpoon with flint point, one-twelfth. 3. Harpoon-point of bone and nephrite, one-half. 4. Bone leister, one-third. 5. Awl, one-half. 6. Harpoon, one-twelfth. 7. Flint dart-point, one-half. 8. Arrows or harpoon-ends with points of iron, stone or glass, one-eighth. 9. Quiver, one-eighth.

instituting a comparison between the household articles of the Eskimo and the Chukches, I examined carefully the skin-bags which the natives had with them. In doing so I picked out one thing after the other, while they did not object to me making an inventory. One of them, however, showed great unwillingness to allow me to get to the bottom of the sack, but this just made me curious to ascertain what precious thing was

ESKIMO FAMILY AT PORT CLARENCE.
(After a photograph by L. Palander.)

concealed there. I was urgent, and went through the bag half with violence, until at last, in the bottom, I got a solution of the riddle—a loaded revolver. Several of the natives had also breechloaders. The oldest age with stone implements, and the most recent period with breechloaders, thus here reach hands one to the other.

Many natives were evidently migrating to more northerly hunting-grounds and fishing places, perhaps also to the markets and play-booths, which Dr. John Simpson describes in his well-known paper on the West Eskimo.[1] Others had already pitched their summer tents on the banks of the inner harbour, or of the river before mentioned. On the other hand, there was found in

ESKIMO AT PORT CLARENCE.
After a photograph by L. Palander.)

the region only a small number of winter dwellings abandoned during the warm season of the year. The population consisted, as has been said, of Eskimo. They did not understand a word of Chukch. Among them, however, we found a Chukch woman,

[1] *Further Papers relative to the recent Arctic Expedition, etc.* Presented to both Houses of Parliament. London, 1855, p. 917.

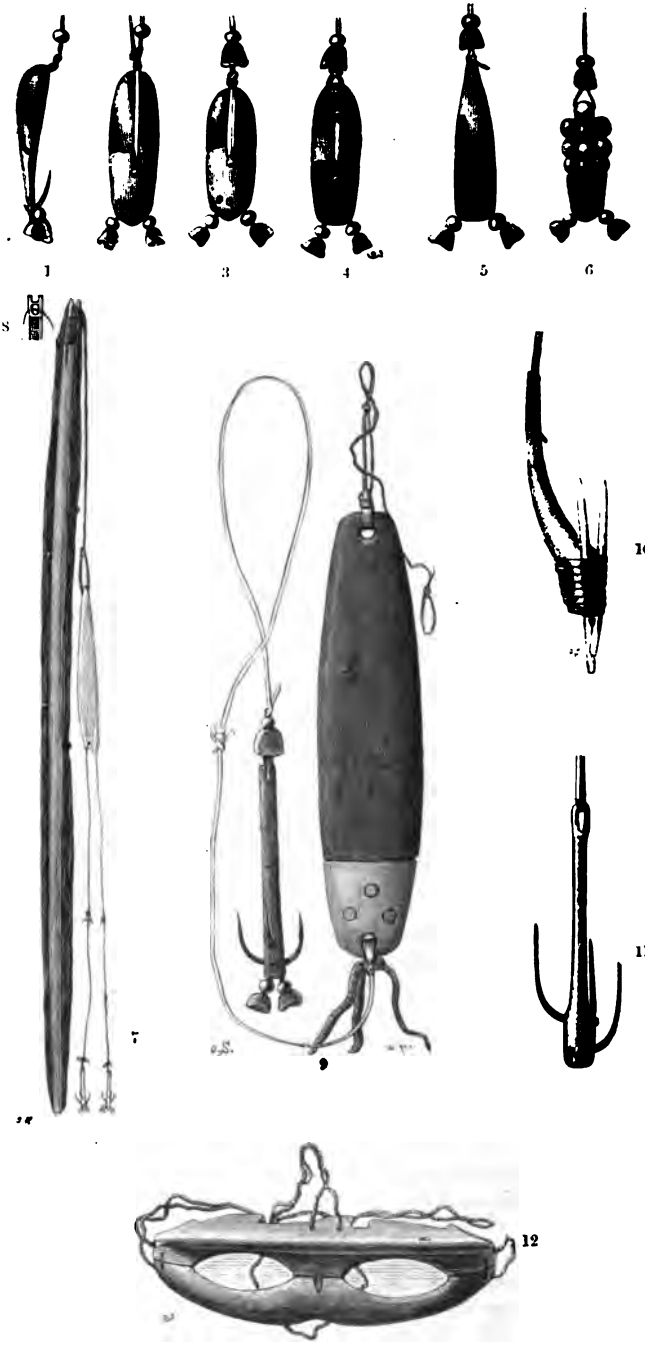
who stated that true Chukches were found also on the American side, north of Behring's Straits. Two of the men spoke a little English, one had even been at San Francisco, another at Honolulu. Many of their household articles reminded us of contact with American whalers, and justice demands the recognition of the fact that in opposition to what we commonly see stated, contact with men of civilised race appears to have been to the advantage and improvement of the savage in an economical and moral point of view. Most of them now lived in summer-tents of thin cotton cloth; many wore European

ESKIMO AT PORT CLARENCE.
(After photographs by L. Palander.)

clothes, others were clad in trousers of seal or reindeer-skin and a light, soft, often beautifully ornamented *pesk* of marmot skin, over which in rainy weather was worn an overcoat made of pieces of gut sewn together. The arrangement of the hair resembled that of the Chukches. The women were tattooed with some lines on the chin. Many of the men wore small moustaches, some even a scanty beard, while others had attempted the American goatee. Most of them, but not all, had two holes from six to seven millimetres in length, cut in the

lips below the corners of the mouth. In these holes were worn large pieces of bone, glass, or stone (figure 9, page 237). But these ornaments were often removed, and then the edges of the large holes closed so much that the face was not much disfigured. Many had in addition a similar hole forward in the lip. It struck me, however, that this strange custom was about to disappear completely, or at least to be Europeanised by the exchange of holes in the ears for holes in the mouth. An almost full-grown young woman had a large blue glass bead hanging from the nose, in whose partition a hole had been made for its suspension, but she was very much embarrassed and hid her head in a fold of mama's *pesk*, when this piece of grandeur attracted general attention. All the women had long strings of beads in the ears. They wore bracelets of iron or copper, resembling those of the Chukches. The colour of the skin was not very dark, with perceptible redness on the cheeks, the hair black and tallow-like, the eyes small, brown, slightly oblique, the face flat, the nose small and depressed at the root. Most of the natives were of average height, appeared to be healthy and in good condition, and were marked neither by striking thinness nor corpulence. The feet and the hands were small.

A certain elegance and order prevailed in their small tents, the floor of which was covered with mats of plaited plants. In many places vessels formed of cocoa-nut shells were to be seen, brought thither, like some of the mats, by whalers from the South Sea Islands. For the most part their household and hunting implements, axes, knives, saws, breechloaders, revolvers, &c., were of American origin, but they still used or preserved in the lumber repositories of the tent, bows and arrows, bird-darts, bone boat-hooks, and various stone implements. The fishing implements especially were made with extraordinary skill of coloured sorts of bone or stone, glass beads, red pieces of the feet of certain swimming birds, &c. The different materials were bound together by twine made of whalebone in such a



ESKIMO FISHING IMPLEMENTS, ETC.

1—6. Salmon hooks of stone of different colours, and bone in the form of beetles, one-half of the natural size. 7. Fishing-rod, one-sixth. 8. End of rod. 9. Bone sinker with tufts and fish-hook, one-half. 10. Fish-hook with bone points, one-half. 11. Fish-hook with iron-wire points, one-half. 12. Snow-spectacles, one-third.

manner that they resembled large beetles, being intended for use in the same way as salmon-flies at home.

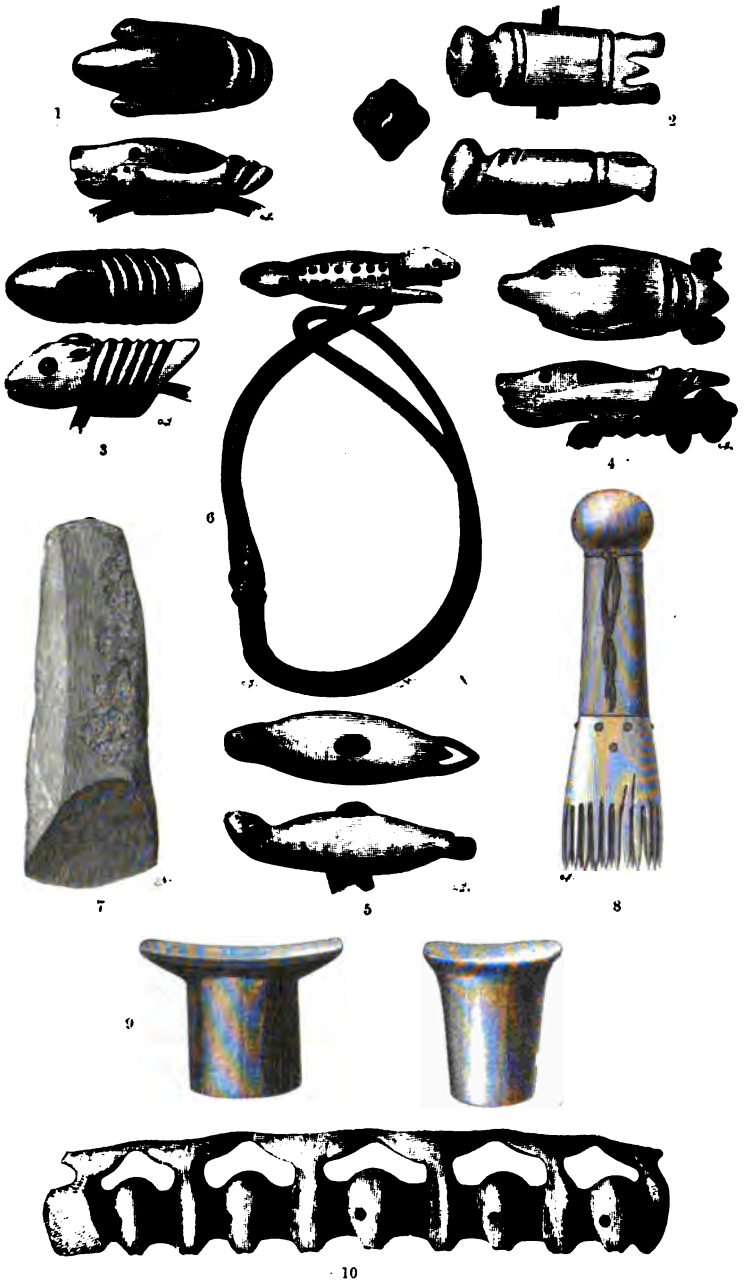
Fire was got partly with steel, flint, and tinder, partly by means of the fire-drill. Many also used American lucifers. The bow of the fire-drill was often of ivory, richly ornamented with hunting figures of different kinds. Their tools were more elegant, better carved and more richly coloured with graphite[1] and red ochre than those of the Chukches; the people were better off and owned a larger number of skin-boats, both *kayaks* and *umiaks*. This undoubtedly depends on the sea being here covered with ice for a shorter time and the ice being thinner than on the Asiatic side, and the hunting accordingly being better. All the old accounts however agree in representing that in former times the Chukches were recognised as a great power by the other savage tribes in these regions, but all recent observations indicate that that time is now past. A certain respect for them, however, appears still to prevail among their neighbours.

[1] Graphite must be found in great abundance on the Asiatic side of Behring's Straits. I procured during winter a number of pieces, which had evidently been rolled in running water. Chamisso mentions in Kotzebue's Voyages (iii. p. 169) that he had seen this mineral along with red ochre among the inhabitants at St. Lawrence Bay; and Lieut. Hooper states in his work (p. 139), that graphite and red ochre are found at the village Oongwysac between Chukotskoj-nos and Behring's Straits. The latter colour was sold at a high price to the inhabitants of distant encampments. These minerals have undoubtedly been used in the same way from time immemorial, and they are probably, like flint and nephrite, among the few kinds of stone which were used by the men of the Stone Age. So far as is known, graphite came first into use in Europe during the middle ages. A black-lead pencil is mentioned and delineated for the first time by Conrad Gessner in 1565. The rich but now exhausted graphite seam at Borrowdale, in England, is mentioned for the first time by Dr. Merret in 1667, as containing a useful mineral peculiar to England. Very rich graphite seams have been found during recent decades, both at the mouth of the Yenisej (Sidoroff's graphite quarry) and at a spur of the Sayan mountains in the southern part of Siberia (Alibert's graphite quarry), and these discoveries have played a certain *rôle* in the recent history of the exploration of the country.

The natives, after the first mistrust had disappeared, were friendly and accommodating, honourable in their dealings though given to begging and to much haggling in making a bargain. There appeared to be no chief among them; complete equality prevailed, and the position of the woman did not appear to be inferior to that of the man. The children were what we would call in Europe well brought up, though they got no bringing up at all. All were heathens. The liking for spirits appeared to be less strong than among the Chukches. We learn besides that all selling of spirits to savages is not only forbidden on the American side, but forbidden in such a way that the law is obeyed.

During our stay among the Chukches my supply of articles for barter was very limited; for up to the hour of departure uncertainty prevailed as to the time at which we would get free, and I was therefore compelled to be sparing of the stores. I often found it difficult on that account to induce a Chukch to part with things which I wished to acquire. Here on the contrary I was a rich man, thanks to the large surplus that was over from our abundant winter equipment, which of course in warm regions would have been of no use to us. I turned my riches to account by making visits like a pedlar in the tent villages with sacks full of felt hats, thick clothes, stockings, ammunition, &c., for which goods I obtained a beautiful and choice collection of ethnographical articles. Among these may be mentioned beautiful bone etchings and carvings, and several arrow-points and other tools of a species of nephrite,[1] which is

[1] Nephrite is a light green, sometimes grass-green, very hard and compact species of amphibolite, which occurs in High Asia, Mexico, and New Zealand. At all these places it has been employed for stone implements, vases, pipes, &c. The Chinese put an immensely high value upon it, and the wish to procure nephrite is said often to have determined their politics, to have caused wars, and impressed its stamp on treaties of peace concluded between millions. I also consider it probable that the precious Vasa Murrhina, which was brought to Rome after the campaign against



ESKIMO BONE-CARVINGS, ETC.

1—5. Buttons to carrying-straps, representing heads of the Polar bear, seals, &c., carved in walrus ivory, one-half of the natural size. 6. Carrying-strap with a similar button, carved in the form of a seal, one-third. 7 Stone chisel, one-half. 8. Comb, one-third. 9. Buttons of bone, glass, or stone, to be placed in holes in the lips, natural size. 10. Ivory diadem, two-thirds.

so puzzlingly like the well-known nephrite from High Asia, that I am disposed to believe that it actually comes originally from that locality. In such a case the occurrence of nephrite at Behring's Straits is important, because it cannot be explained in any other way than either by supposing that the tribes living here have carried the mineral with them from their original home in High Asia, or that during the Stone Age of High Asia a like extended commercial intercommunication took place between the wild races as now exists, or at least some decades ago existed, along the north parts of Asia and America.

On the north side of the harbour we found an old European or American train-oil boiling establishment. In the neighbourhood of it were two Eskimo graves. The corpses had been laid on the ground fully clothed, without the protection of any coffin, but surrounded by a close fence consisting of a number of tent poles driven crosswise into the ground. Alongside one of the corpses lay a *kayak* with oars, a loaded double-barrelled gun with locks at half-cock and caps on, various other weapons, clothes, tinderbox, snow-shoes, drinking-vessels, two masks carved in wood and smeared with blood (figures 1 and 2, page 241), and strangely-shaped animal figures. Such were seen also in the tents. Bags of sealskin, intended to be

Mithridates, and has given rise to so much discussion, was nephrite. Nephrite was also perhaps the first of all stones to be used ornamentally. For we find axes and chisels of this material among the people of the Stone Age both in Europe (where no locality is known where unworked nephrite is found) and in Asia, America, and New Zealand. In Asia implements of nephrite are found both on the Chukch Peninsula and in old graves from the Stone Age in the southern part of the country. They have been discovered at Telma, sixty versts from Irkutsk, by Mr. J. N. Wilkoffski, conservator of the East Siberian Geographical Society. In scientific mineralogy nephrite is first mentioned under the name of *Kascholong* (i.e. a species of stone from the river Kasch). It has been brought home under this name by Renat, a prisoner-of-war from Charles XII.'s army, from High Asia, and was given by him to Swedish mineralogists, who described it very correctly, though kascholong has since been erroneously considered a species of quartz.

inflated and fastened to harpoons as floats, were sometimes ornamented with small faces carved in wood (figure 3, page 241). In one of the two amulets of the same kind, which I brought home with me, one eye is represented by a piece of blue enamel stuck in, and the other by a piece of iron pyrites fixed in the same way. Behind two tents were found, erected on posts a metre and a half in height, roughly-formed wooden images of birds with expanded wings painted red. I endeavoured without success to purchase these tent-idols[1] for a large new felt hat—an article of exchange for which in other cases I could obtain almost anything whatever. A dazzlingly

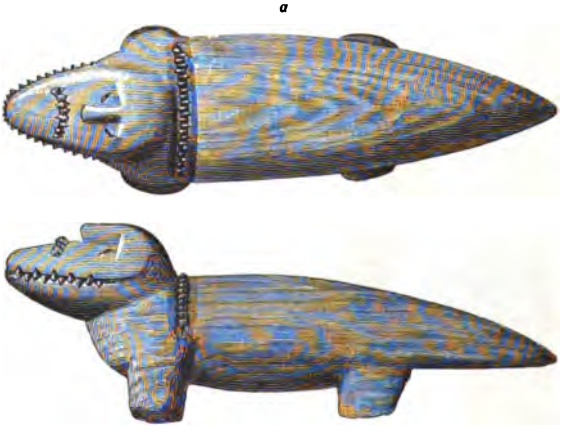
ESKIMO GRAVE.
(After a drawing by O. Nordquist.)

white *kayak* of a very elegant shape, on the other hand, I purchased without difficulty for an old felt hat and 500 Remington cartridges.

As a peculiar proof of the ingenuity of the Americans when offering their goods for sale, it may be mentioned in conclusion that an Eskimo, who came to the vessel during our stay in the harbour, showed us a printed paper, by which a commercial house at San Francisco offered to "sporting gentlemen" at Behring's Straits (Eskimo ?) their stock of excellent hunting shot.

[1] The Eskimo however, like the Chukches, do not appear to have any proper religion or idea of a life after this.

As the west coast of Europe is washed by the Gulf Stream, there also runs along the Pacific coast of America a warm current, which gives the land a much milder climate than that which prevails on the neighbouring Asiatic side, where, as on the east coast of Greenland, there runs a cold northerly current. The limit of trees therefore in north-western America goes a good way *north of* Behring's Straits, while on the Chukch Peninsula wood appears to be wholly wanting. Even at Port Clarence the coast is devoid of trees, but some kilometres



ANIMAL FIGURE FROM AN ESKIMO GRAVE.
a. From above. *b*. From the side.
(One-third of the natural size.)

into the country alder bushes two feet high are met with, and behind the coast hills actual forests probably occur. Vegetation is besides already luxuriant at the coast, and far away here, on the coast of the New World, many species are to be found nearly allied to Scandinavian plants, among them the *Linnæa*. Dr. Kjellman therefore reaped here a rich botanical harvest, valuable for the purpose of comparison with the flora of the neighbouring portion of Asia and other High Arctic regions.

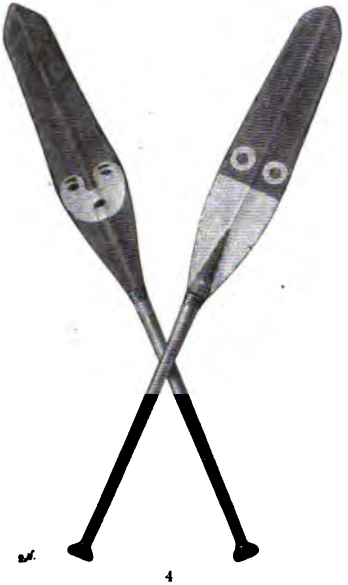
1

2

3

5

6



4

7

ETHNOGRAPHICAL OBJECTS FROM PORT CLARENCE.

1, 2. **Wooden masks, found at a grave, one-sixth of the natural size. 3. Amulet, a face with one eye of enamel, the other of pyrites, from a harpoon-float of sealskin, one-third. 4. Oars, one-nineteenth. 5. Boathook, one-twelfth. 6. The hook of carved ivory, one-fourth. 7. Carved knife handle (?) of ivory, one-half.**

Dr. Almquist in like manner collected very extensive materials for investigating the lichen-flora of the region, probably before very incompletely known. The harvest of the zoologists, on the other hand, was scanty. Notwithstanding the luxuriant vegetation land-evertebrates appeared to occur in a much smaller number of species than in northern Norway. Of beetles, for instance, only from ten to twenty species could be found, mainly Harpalids and Staphylinids, and of land and fresh-water mollusca only seven or eight species, besides which nearly all occurred very sparingly. Among remarkable fishes may be mentioned the same black marsh-fish which we caught at Yinretlen. The avi-fauna was scanty for a high northern land, and of wild mammalia we saw only musk-rats. Even the dredgings in the harbour yielded, on account of the unfavourable nature of the bottom, only an inconsiderable number of animals and algæ.

On the 26th July, at three o'clock in the afternoon, we weighed anchor and steamed back in splendid weather and with for the most part a favourable wind to the shore of the Old World. In order to determine the salinity and temperature at different depths, soundings were made and samples of water taken every four hours during the passage across the straits. Trawling was besides carried on three times in the twenty-four hours, commonly with an extraordinarily abundant yield, among other things of large shells, as, for instance, the beautiful *Fusus deformis*, Reeve, with its twist to the left, and some large species of crabs. One of the latter (*Chionoecetes opilio*, Krøyer) the dredge sometimes brought up in hundreds. We cooked and ate them and found them excellent, though not very rich in flesh. The taste was somewhat sooty.

Lieutenant Bove constructed the diagram reproduced at page 244, which is based on the soundings and other observations made during the passage, from which we see how shallow is the sound which in the northernmost part of the

Pacific separates the Old World from the New. An elevation of the land less than that which has taken place since the glacial period at the well-known Chapel Hills at Uddevalla would evidently be sufficient to unite the two worlds with each other by a broad bridge, and a corresponding depression would have been enough to separate them if, as is probable, they were at one time continuous. The diagram shows besides that the deepest channel is quite close to the coast of the Chukch

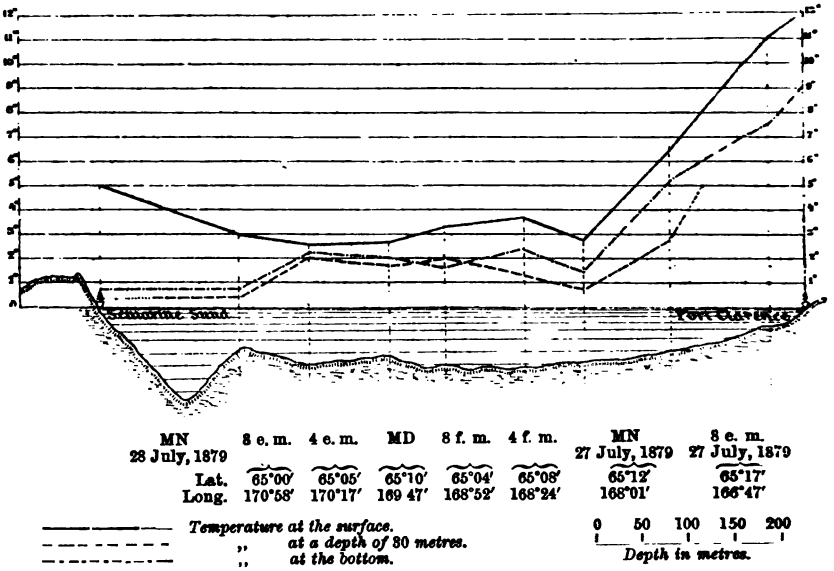
SHELL FROM BEHRING'S STRAITS.
Fusus deformis, Reeve.

Peninsula, and that that channel contains a mass of cold water, which is separated by a ridge from the warmer water on the American side.

If we examine a map of Siberia we shall find, as I have already pointed out, that its coasts at most places are straight, and are thus neither indented with deep fjords surrounded with high mountains like the west coast of Norway, nor protected by an archipelago of islands like the greater part of the coasts of Scandinavia and Finland. Certain parts of the Chukch

Peninsula, especially its south-eastern portion, form the only exception to this rule. Several small fjords here cut into the coasts, which consist of stratified granitic rocks, and in the offing two large and several small rocky islands form an archipelago, separated from the mainland by the deep Senjavin Sound. The wish to give our naturalists an opportunity of once more prosecuting their examination of the natural history

DIAGRAM,
Showing the Temperature and Depth of the water at Behring's Straits between Port Clarence and Senjavin Sound.
By G. Bove.



of the Chukch Peninsula, and the desire to study one of the few parts of the Siberian coast which in all probability were formerly covered with inland ice, led me to choose this place for the second anchorage of the *Vega* on the Asiatic side south of Behring's Straits. The *Vega* accordingly anchored here on the forenoon of the 28th July, but not, as was at first intended, in Glasenapp Harbour, because it was still occupied by

unbroken ice, but in the mouth of the most northerly of the fjords, Konyam Bay.

This portion of the Chukch Peninsula had been visited before us by the corvette *Senjavin*, commanded by Captain, afterwards Admiral, Fr. Lütke, and by an English Franklin Expedition on board the *Plover*, commanded by Captain Moore. Lütke stayed here with his companions, the naturalists MERTENS, POSTELS, and KITTLITZ, some days in August 1828, during which the harbour was surveyed and various observations in ethnography and the natural sciences made. Moore wintered at this place in 1848-49. I have already stated that we have his companion, Lieut. W. H. Hooper, to thank for very valuable information relating to the tribes which live in the neighbourhood. The region appears to have been then inhabited by a rather dense population. Now there lived at the bay where we had anchored only three reindeer-Chukch families, and the neighbouring islands must at the time have been uninhabited, or perhaps the arrival of the *Vega* may not have been observed, for no natives came on board, which otherwise would probably have been the case.

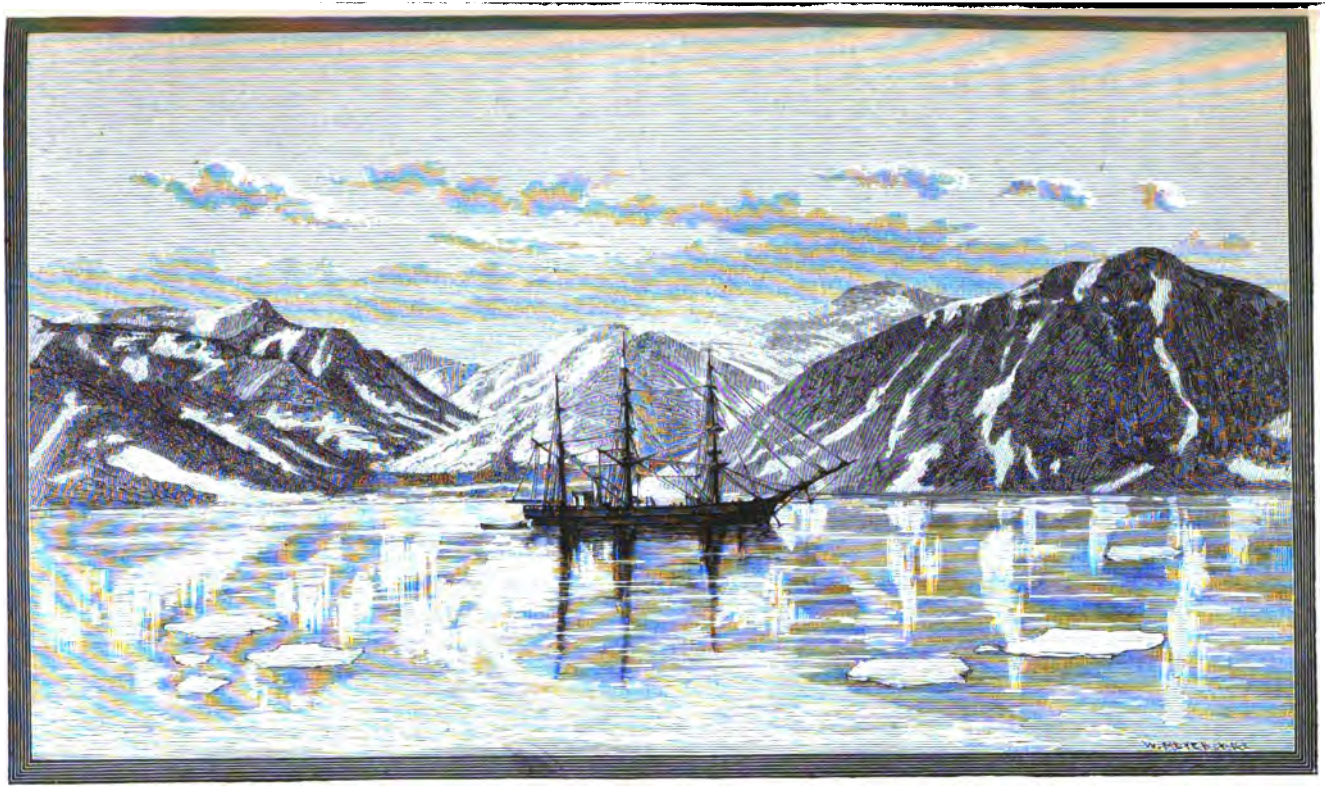
The shore at the south-east part of Konyam Bay, in which the *Vega* now lay at anchor for a couple of days, consists of a rather desolate bog, in which a large number of cranes were breeding. Farther into the country several mountain summits rise to a height of nearly 600 metres. The collections of the zoologists and botanists on this shore were very scanty, but on the north side of the bay, to which excursions were made with the steam-launch, grassy slopes were met with, with pretty high bushy thickets and a great variety of flowers, which enriched Dr. Kjellman's collection of the higher plants from the north coast of Asia with about seventy species. Here were found too the first land mollusca (Succinea, Limax, Helix, Pupa, &c.) on the Chukch Peninsula.[1]

[1] We have already found some land mollusca at Port Clarence, but none at St. Lawrence Bay. The northernmost *find* of such animals now known

We also visited the dwellings of the reindeer-Chukch families. They resembled the Chukch tents we had seen before, and the mode of life of the inhabitants differed little from that of the coast-Chukches, with whom we passed the winter. They were even clothed in the same way, excepting that the men wore a number of small bells in the belt. The number of the reindeer which the three families owned was, according to an enumeration which I made when the herd had with evident pleasure settled down at noon in warm sunshine on a snow-field in the neighbourhood of the tents, only about 400, thus considerably fewer than is required to feed three Lapp families. The Chukches have instead a better supply of fish, and, above all, better hunting than the Lapps; they also do not drink any coffee, and themselves collect a part of their food from the vegetable kingdom. The natives received us in a very friendly way, and offered to sell or rather barter three reindeer, a transaction which on account of our hasty departure was not carried into effect.

The mountains in the neighbourhood of Konyam Bay were high and split up into pointed summits with deep valleys still partly filled with snow. No glaciers appear to exist there at present. Probably however the fjords here and the sounds, like St. Lawrence Bay, Kolyutschin Bay, and probably all the other deeper bays on the coast of the Chukch Peninsula, have been excavated by former glaciers. It may perhaps be uncertain whether a true inland-ice covered the whole country; it is certain that the ice-cap did not extend over the plains of Siberia, where it can be proved that no Ice Age in a Scandinavian sense ever existed, and where the state of the land from the Jurassic period onwards was indeed subjected to some changes, but to none of the thoroughgoing mundane revolutions which in former times geologists loved to depict in so bright

was made by Von Middendorff, who found a species of Physa on the Taimur Peninsula.



KONYAM BAY.

(After a photograph by L. Palander.)

colours. At least the direction of the rivers appears to have been unchanged since then. Perhaps even the difference between the Siberia where Chikanovski's *Ginko* woods grew and the mammoth roamed about, and that where now at a limited depth under the surface constantly frozen ground is to be met with, depends merely on the isothermal lines having sunk slightly towards the equator.

The neighbourhood of Konyam Bay consists of crystalline rocks, granite poor in mica, and mica-schist lowermost, and then grey non-fossiliferous carbonate of lime, and last of all magnesian schists, porphyry, and quartzites. On the summits of the hills the granite has a rough trachytic appearance, but does not pass into true trachyte. Here however we are already in the neighbourhood of the volcanic hearths of Kamchatka, which for instance is shown by the hot spring, which Hooper discovered not far from the coast during a sledge journey towards Behring's Straits. In the middle of the severe cold of February its waters had a temperature of + 69° C. Hot steam and drifting snow combined had thrown over the spring a lofty vault of dazzling whiteness formed of masses of snow converted into ice and covered with ice-crystals. The Chukches themselves appear to have found the contrast striking between the hot spring from the interior of the earth and the cold, snow, and ice on its surface. They offered blue glass beads to the spring, and showed Hooper, as something remarkable, that it was possible to boil fish in it, though the mineral water gave the boiled fish a bitter unpleasant taste.[1]

The interior of Konyam Bay was during our stay there still covered by an unbroken sheet of ice. This broke up on the

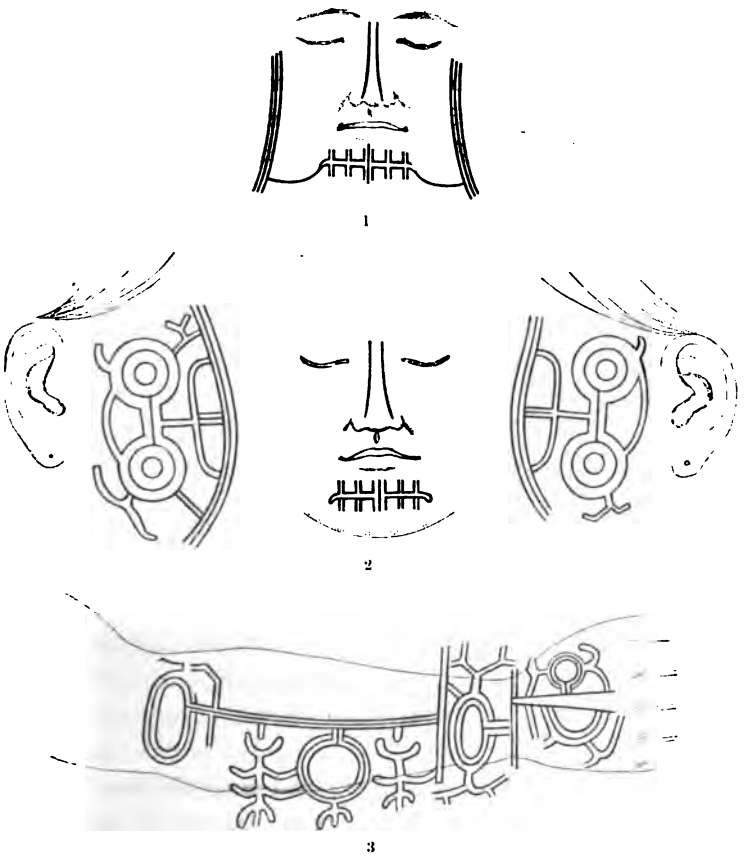
[1] That a fire-emitting mountain was to be found in Siberia east of the Yenisej is already mentioned in a treatise by Isaak Massa, inserted in Hessal Gerritz, *Detectio Freti*, Amsterdam, 1612. The rumour about the volcanos of Kamchatka thus appears to have reached Europe at that early date.

afternoon of the 30th July, and had almost, rotten as it was, suddenly brought the voyage of the *Vega* to a termination by pressing her ashore. Fortunately the danger was observed in time. Steam was got up, the anchor weighed, and the vessel removed to the open part of the fjord. As on this account several cubic feet of coal had to be used for getting up steam, as our hitherto abundant stock of coal must now be saved, and as in the last place I was still urged forward by the fear that a too lengthened delay in sending home despatches might not only cause much anxiety but also lead to a heavy expenditure of money, I preferred to sail on immediately rather than to enter a safer harbour in the neighbourhood from which the scientific work might continue to be prosecuted.

The course was now shaped for the north-west point of St. Lawrence Island. A little off Senjavin Sound we saw drift-ice for the last time. On the whole the quantity of ice which drifts down through Behring's Straits into the Pacific is not very great, and most of that which is met with in summer on the Asiatic side of the Behring Sea, is evidently formed in fjords and bays along the coast. South of Behring's Straits accordingly I saw not a single iceberg nor any large block of glacier-ice, but only even and very rotten fields of bay-ice.

The *Vega* was anchored on the 31st July in an open bay on the north-western side of St. Lawrence Island. This island, called by the natives Enguae, is the largest one between the Aleutian Islands and Behring's Straits. It lies nearer Asia than America, but is considered to belong to the latter, for which reason it was handed over along with the Alaska Territory by Russia to the United States. The island is inhabited by a few Eskimo families, who have commercial relations with their Chukch neighbours on the Russian side, and therefore have adopted some words from their language. Their dress also resembles that of the Chukches, with the exception that, wanting reindeer-skin, they use *pesks* made of the skins of birds and

marmots. Like the Chukches and Eskimo they use overcoats of pieces of seal-gut sewed together. On St. Lawrence Island their dress is much ornamented, chiefly with tufts of feathers of



TATTOOING PATTERNS, FROM ST. LAWRENCE ISLAND.
1, 2. Face-tattooing. 3. Arm-tattooing.
(After drawings by A. Stuxberg.)

the sea-fowl that breed in innumerable flocks on the island. It even appears that gut clothes are made here for sale to other

tribes; otherwise it would be difficult to explain how Kotzebue's sailors could in half an hour purchase at a single encampment 200 coats of this kind. At the time of our visit all the natives went bareheaded, the men with their black tallow-like hair clipped to the root, with the exception of the common small border above the forehead. The women wore their hair plaited and adorned with beads, and were much tattooed, partly after very intricate patterns, as is shown by the accompanying woodcuts. Like the children they mostly went barefooted and

TATTOOED WOMAN, FROM ST. LAWRENCE ISLAND.
(After a drawing by A. Stuxberg.)

barelegged. They were well grown, and many did not look ill, but all were merciless beggars, who actually followed our naturalists on their excursions on land.

The summer-tents were irregular, but pretty clean and light huts of gut, stretched on a frame of drift-wood and whale-bones. The winter dwellings were now abandoned. They appeared to consist of holes in the earth, which were covered above, with the exception of a square opening, with drift-wood and turf.

During winter a sealskin tent was probably stretched over this opening, but it was removed for the time, probably to permit the summer heat to penetrate into the hole and melt the ice, which had collected during winter on its walls. At several tents we found large under-jaws of whales fixed in the ground. They were perforated above, and I suppose that the winter-tent, in the absence of other framework, was stretched over them. Masses of whale-bones lay thrown up along the shore, evidently belonging to the same species as those we collected at the shore-dunes at Pitlekaj. In the neighbourhood of the tents graves were also found. The corpses had been placed, unburned, in some cleft among the rocks which are split up by the frost, and often converted into immense stone mounds. They had afterwards been covered with stones, and skulls of the bear and the seal and whale-bones had been offered or scattered around the grave.

North-east of the anchorage the shore was formed of low hills rising with a steep slope from the sea. Here and there ruinlike cliffs projected from the hills, resembling those we saw on the coast of Chukch Land. But the rock here consisted of the same sort of granite which formed the lowermost stratum at Konyam Bay. It was principally at the foot of these slopes that the natives erected their dwellings. South-west of the anchorage commenced a very extensive plain, which towards the interior of the island was marshy, but along the coast formed a firm, even, grassy meadow exceedingly rich in flowers. It was gay with the large sunflower-like *Arnica Pseudo-Arnica*, and another species of Senecio (*Senecio frigidus*); the *Oxytropis nigrescens*, close-tufted and rich in flowers, not stunted here as in Chukch Land; several species of Pedicularis in their fullest bloom (*P. sudetica, P. Langsdorfii, P. Oederi* and *P. capitata*); the stately snow auricula (*Primula nivalis*), and the pretty *Primula borealis*. As characteristic of the vegetation at this place may also be mentioned several ranunculi, an anemone (*Anemone narcissiflora*), a species of monkshood

with flowers few indeed, but so much the larger on that account, large tufts of *Silene acaulis* and *Alsine macrocarpa*, studded with flowers, several Saxifrages, two Claytoniæ, the *Cl. acutifolia*, important as a food-plant in the housekeeping of the Chukches, and the tender *Cl. sarmentosa* with its delicate, slightly rose-coloured flowers, and, where the ground was stony, long but yet flowerless, slightly green tendrils of the favourite plant of our homeland, the *Linnæa borealis*. Dr. Kjellman thus reaped a rich harvest of higher plants; and a fine collection of land and marine animals, lichens and algæ was also made here. The ground consisted of sand in which lay large granite blocks, which we in Sweden would call erratic. They appeared however not to have been transported hither, but to be lying *in situ*, having along with the sand probably arisen through the disintegration of the rocks.

In the sea we found not a few algæ and a true littoral evertebrate-fauna, poor in species indeed, something which is completely absent in the Polar seas proper. As I walked along the coast I saw five pretty large self-coloured greyish-brown seals sunning themselves on stones a short distance from land. They belonged to a species which I had never seen in the Polar seas. As there was no boat at hand, I forbade the hunters that accompanied me, though the seals were within range, to test their skill as shots upon them. Perhaps they were females of *Histriophoca fasciata*, whose beautifully marked skin (of the male) I had seen and described at St. Lawrence Bay. The natives had a few dogs but no reindeer, which however might find food on the island in thousands. No *kayaks* were in use, but large *baydars* of the same construction as those of the Chukches.

St. Lawrence Island was discovered during Behring's first voyage, but the first who came into contact with the natives was Otto von Kotzebue[1] (on the 27th June 1816, and the 20th July

[1] Kotzebue says that he was the first seafarer who visited the island. This however is incorrect. Billings landed there on the 1st August (21st July), 1791. From the vessel some natives was seen and a *baydar* which

1817). The inhabitants had not before seen any Europeans, and they received the foreigners with a friendliness which exposed Kotzebue to severe suffering. Of this he gives the following account:—

"So long as the naturalists wandered about on the hills I stayed with my acquaintances, who, when they found that I was the commander, invited me into their tents. Here a dirty skin was spread on the floor, on which I had to sit, and then they came in one after the other, embraced me, rubbed their noses hard against mine, and finished their caresses by spitting in their hands and then stroking me several times over the face. Although these proofs of friendship gave me very little pleasure, I bore all patiently; the only thing I did to lighten their caresses somewhat was to distribute tobacco leaves. These the natives received with great pleasure, but they wished immediately to renew their proofs of friendship. Now I betook myself with speed to knives, scissors, and beads, and by distributing some succeeded in averting a new attack. But a still greater calamity awaited me when in order to refresh me bodily they brought forward a wooden tray with whale blubber. Nauseous as this food is to a European stomach I boldly attacked the dish. This, along with new presents which I distributed, impressed the seal on the friendly relation between us. After the meal our hosts made arrangements for dancing and singing, which was accompanied on a little tambourine."[1]

As von Kotzebue two days after sailed past the north point of the island he met three *baydars*. In one of them a man stood up, held up a little dog and pierced it through with his knife, as Kotzebue believed, as a sacrifice to the foreigners.[2]

was rowed along the coast. The natives however were frightened by some gunshots fired as a signal (Sarytchev's *Reise*, ii. p. 91, Sauer, p. 239). Billings says that the place where he landed (the south-east point of the island) was nearly covered with bones of sea-animals. It would be important to have these thoroughly examined, as it is not impossible that Steller's sea-cow (Rhytina) may in former times have occasionally come to this coast. At all events important contributions to a knowledge of the species of whales in Behring's Straits may be gained here.

[1] Otto von Kotzebue. *Entdeckungs-Reise an die Sud-See und nach der Behring-Strasse, 1815-18.* Weimar, 1821, i. p. 135; ii. p. 104; iii. pp. 171 and 178.

[2] On the days after our arrival at Pitlekaj several dogs were killed. I

Since 1817 several exploring expeditions have landed on St. Lawrence Island, but always only for a few hours. It is very dangerous to stay long here with a vessel. For there is no known haven on the coast of this large island, which is surrounded by an open sea. In consequence of the heavy swell which almost constantly prevails here, when the surrounding sea is clear of ice, it is difficult to land on the island with a boat, and the vessel anchored in the open road is constantly exposed to be thrown by a storm rising unexpectedly upon the shore cliffs. This held good in fullest measure of the *Vega's* anchorage, and Captain Palander was on this account anxious to leave the place as soon as possible. On the 2nd August at three o'clock in the afternoon we accordingly resumed our voyage. The course was shaped at first for Karaginsk Island on the east coast of Kamchatka, where it was my intention to stay some days in order to get an opportunity of making a comparison between the natural conditions of middle Kamchatka and the Chukch Peninsula. But as unfavourable winds delayed our passage longer than I had calculated on, I abandoned, though unwillingly, the plan of landing there. The Commander's Islands became instead the nearest goal of the expedition. Here the *Vega* anchored on the 14th August in a very indifferent harbour completely open to the west, north-west, and south, lying on the west side of Behring Island, between the main island and a small island lying off it.

then believed that this was done because the natives were unwilling to feed them during winter, but it is not impossible that they sacrificed them to avert the misfortunes which it was feared the arrival of the foreigners would bring with it.

CHAPTER XV.

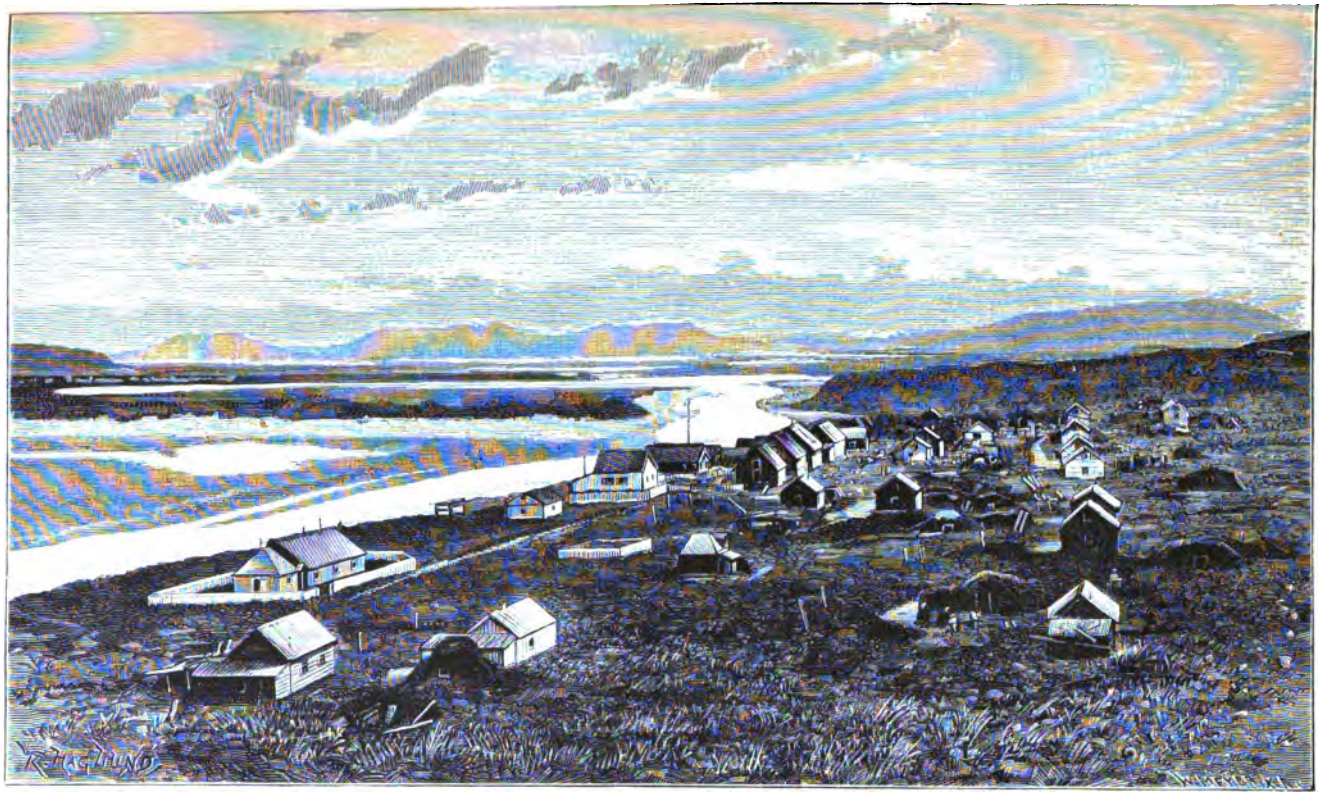
The position of Behring Island—Its inhabitants—The discovery of the island by Behring—Behring's death—Steller—The former and present Fauna on the island: foxes, sea-otters, sea-cows, sea-lions, and sea-bears—Collection of bones of the Rhytina—Visit to a "rookery"—Toporkoff Island — Alexander Dubovski — Voyage to Yokohama—Lightning-stroke.

BEHRING ISLAND is situated between 54° 40′ and 55° 25′ N.L. and 165° 40′ and 166° 40′ E.L. from Greenwich. It is the westernmost and nearest Kamchatka of the islands in the long chain formed by volcanic action, which bounds the Behring Sea on the south between 51° and 56° N.L. Together with the neighbouring Copper Island and some small islands and rocks lying round about, it forms a peculiar group of islands separated from the Aleutian Islands proper, named, after the rank of the great seafarer who perished here, Commander's or Commandirski Islands. They belong not to America but to Asia, and are Russian territory. Notwithstanding this the American Alaska Company has acquired the right of hunting there,[1] and maintains on the main islands two not inconsiderable commercial stations, which supply the inhabitants, several hundreds in number, with provisions and manufactured goods, the company buying from them instead furs, principally the skin of an eared seal (the sea-cat or

[1] In February 1871 the right of hunting on these islands was granted by the Russian government to Hutchinson, Kohl, Philippeus & Co., who have made over their rights to the Alaska Commercial Company of San Francisco.

sea-bear), of which from 20,000 to 50,000[1] are killed yearly in the region. Some Russian authorities are also settled on the island to guard the rights of the Russian state and maintain order. Half a dozen serviceable wooden houses have been built here as dwellings for the officials of the Russian Government and the American Company, for storehouses, shops, &c. The natives live partly in very roomy and in the inside not uncomfortable turf houses, partly in small wooden houses which the company endeavours gradually to substitute for the former, by yearly ordering some wooden buildings and presenting them to the most deserving of the population. Every family has its own house. There is also a Greek-Catholic church and a spacious schoolhouse. The latter is intended for Aleutian children. The school was unfortunately closed at the time of our visit, but, to judge by the writing books which lay about in the schoolroom, the education here is not to be despised. The specimens of writing at least were distinguished by their cleanness, and by an even and beautiful style. At "the colony" the houses were collected at one place into a village, situated near the sea-shore at a suitable distance from the fishing ground in a valley overgrown in summer by a rich vegetation, but treeless and surrounded by treeless rounded heights. From the sea this village has the look of a northern fishing station. There are besides some scattered houses here and there on other parts of the island, for instance on its north-eastern side, where the potato is said to be cultivated

[1] According to a communication made to me by Mr. Henry W. Elliot, who, in order to study the fur-bearing seals in the North Behring Sea, lived a considerable time at the Seal Islands (Pribylov's Islands, &c.) on the American side, and has given an exceedingly interesting account of the animal life there in his work: *A Report upon the Condition of Affairs in the Territory of Alaska*, Washington, 1875: the statement in my report to Dr. Dickson, founded on oral communications of Europeans whom I met with at Behring Island, that from 50,000 to 100,000 animals are killed yearly at Behring and Copper Island, is thus probably somewhat exaggerated.

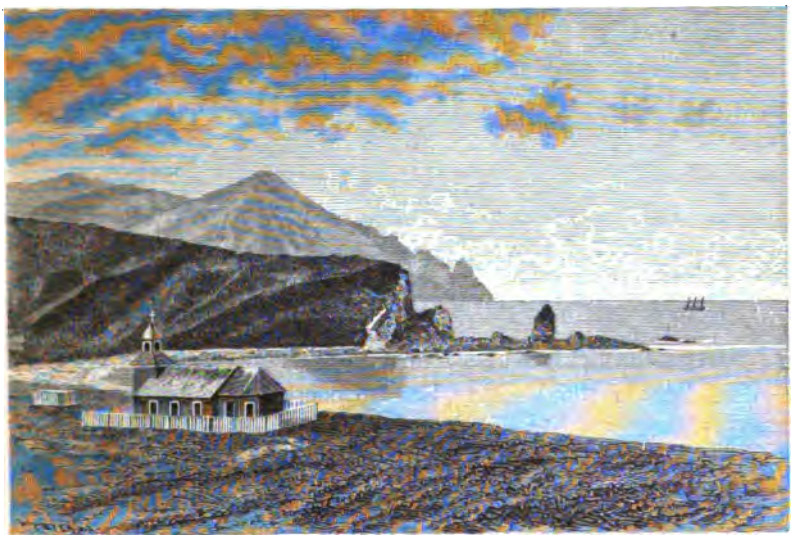


THE "COLONY" ON BEHRING ISLAND.

(After a photograph.)

on a small scale, and at the fishing place on the north side where there are two large sheds for skins and a number of very small earth-holes used only during the slaughter season.

Behring Island, with regard both to geography and natural history, is one of the most remarkable islands in the north part of the Pacific. It was here that Behring after his last unfortunate voyage in the sea which now bears his name, finished his long course as an explorer. He was however survived by many of his followers, among them by the physician and naturalist Steller,



THE "COLONY" ON COPPER ISLAND.
(After a photograph.)

to whom we owe a masterpiece seldom surpassed—a sketch of the natural conditions and animal life on the island, never before visited by man, where he involuntarily passed the time from the middle of November 1741, to the end of August 1742.[1]

[1] Original accounts of the wintering on Behring Island are to be found in Müller's *Sammlung Russischer Geschichte*, St. Petersburg, 1758, iii. pp. 228-238 and 242-268; (Steller's) *Topographische und physikalische*

It was the desire to procure for our museums the skins or skeletons of the many remarkable mammalia occurring here, also to compare the present state of the island which for nearly a century and a half has been exposed to the unsparing thirst of man for sport and plunder, with Steller's spirited and picturesque description, which led me to include a visit to the island in the plan of the expedition. The accounts I got at Behring Island from the American newspapers of the anxiety which our wintering had caused in Europe led me indeed to make our stay there shorter than I at first intended. Our harvest of collections and observations was at all events extraordinarily abundant. But before I proceed to give an account of our own stay on the island, I must devote a few words to its discovery and the first wintering there, which has a quite special interest from the island having never before been trodden by the foot of man. The abundant animal life, then found there, gives us therefore one of the exceedingly few representations we possess of the animal world as it was before man, the lord of the creation, appeared.

After Behring's vessel had drifted about a considerable time at random in the Behring Sea, in consequence of the severe scurvy-epidemic, which had spread to nearly all the men on board, without any dead reckoning being kept, and finally without sail or helmsman, literally at the mercy of wind and waves, those on board on the $\frac{15}{4}$th November, 1741, sighted land, off whose coast the vessel was anchored the following day at 5 o'clock P.M. An hour after the cable gave way, and an enormous sea threw the vessel towards the shore-cliffs. All appeared to be already lost. But the vessel, instead of being driven ashore by new

Beschreibung der Beringsinsel (Pallas' *Neue Nordische Beyträge*, St. Petersburg and Leipzig, 1781-83, ii. p. 225); G. W. Steller's *Tagebuch seiner Seereise aus dem Petripauls Hafen . . . und seiner Begebenheiten auf der Rückreise* (Pallas' *Neueste Nordische Beyträge*, St. Petersburg and Leipzig, 1793-96, i. p. 130; ii. p. 1).

NATIVES OF BEHRING ISLAND.

(After a photograph.)

waves, came unexpectedly into a basin 4½ fathoms deep surrounded by rocks and with quite still water, being connected with the sea only by a single narrow opening. If the unmanageable vessel had not drifted just to that place it would certainly have gone to pieces, and all on board would have perished.

It was only with great difficulty that the sick crew could put out a boat in which Lieut. Waxel and Steller landed. They found the land uninhabited, devoid of wood, and uninviting. But a rivulet with fresh clear water purled yet unfrozen down the mountain sides, and in the sand hills along the coast were found some deep pits, which when enlarged and covered with sails could be used as dwellings. The men who could still stand on their legs all joined in this work. On the $\frac{19}{8}$th November the sick could be removed to land, but, as often happens, many died when they were brought out of the cabin into the fresh air, others while they were being carried from the vessel or immediately after they came to land. All in whom the scurvy had taken the upper hand to that extent that they were already lying in bed on board the vessel, died. The survivors had scarcely time or strength to bury the dead, and found it difficult to protect the corpses from the hungry foxes that swarmed on the island and had not yet learned to be afraid of man. On the $\frac{20}{9}$th Behring was carried on land; he was already much reduced and dejected, and could not be induced to take exercise. He died on the $\frac{19}{8}$th December.

VITUS BEHRING was a Dane by birth, and when a young man had already made voyages to the East and West Indies. In 1707 he was received into the Russian navy as officer, and as such took part in all the warlike enterprises of that fleet against Sweden. He was in a way buried alive on the island that now bears his name, for at last he did not permit his men to remove the sand that rolled down upon him from the walls of the sand pit in which he rested. For he thought that the sand warmed his chilled body. Before

the corpse could be properly buried it had therefore to be dug out of its bed, a circumstance which appears to have produced a disagreeable impression on the survivors. The two lieutenants, Waxel and Chitrov, had kept themselves in pretty good health at sea, but now fell seriously ill, though they recovered. Only the physician of the expedition, Georg Wilhelm Steller, was all the time in good health, and that a single man of the whole crew escaped with his life was clearly due to the skill of this gifted man, to his invincible energy and his cheerful and sanguine disposition. These qualities were also abundantly tested during the wintering. On the night before the $\frac{10\text{th December}}{29\text{th November}}$, the vessel, on which no watch was kept, because all the men were required on land to care for the sick, was cast ashore by a violent E.S.E. storm. So great a quantity of provisions was thus lost, that the remaining stock was not sufficient by itself to yield enough food for all the men during a whole winter. Men were therefore sent out in all directions to inquire into the state of the land. They returned with the information that the vessel had stranded, not, as was hoped at first, on the mainland but on an uninhabited, woodless island. It was thus clear to the shipwrecked men that in order to be saved they could rely only on their judgment and strength. At the beginning they found that if any provisions were to be reserved for the voyage home, it was necessary that they should support themselves during winter to a considerable extent by hunting. They did not like to use the flesh of the fox for food, and at first kept to that of the sea-otter. This animal at present is very scarce on Behring Island, but at that time the shore was covered with whole herds of it. They had no fear of man, came from curiosity straight to the fires, and did not run away when any one approached. A dear-bought experience, however, soon taught them caution; at all events, from 800 to 900 head were taken, a splendid catch when we consider

that the skin of this animal at the Chinese frontier fetched from 80 to 100 roubles each. Besides, in the beginning of winter two whales stranded on the island. The shipwrecked men considered these their provision depôts, and appear to have preferred whale blubber to the flesh of the sea-otter, which had an unpleasant taste and was tough as leather.[1]

In spring the sea-otters disappeared, but now there came to the island in their stead other animals in large herds, viz. sea-bears, seals, and sea-lions. The flesh of the young sea-lion was considered a great delicacy.[2] When the sea-otters became scarcer and more shy and difficult to catch, the shipwrecked men found means also to kill sea-cows, whose flesh Steller considered equal to beef. Several barrels of their flesh were even salted to serve as provisions during the return journey. As the land became clear of snow in the middle of April, Waxel called together the forty-five men who survived to a consultation regarding the steps that ought to be taken in order to reach the mainland. Among many different proposals, that was adopted of building a new vessel with the materials supplied by the stranded one. The three ship-carpenters who had been on board were dead. But fortunately there was among the survivors a Cossack, SAVA STARODUBZOV, who had taken part as a workman in shipbuilding at Okotsk, and now undertook to manage the building of the new vessel. With necessity for a teacher he also succeeded in executing

[1] According to Müller, whose statements (based on communications by Waxel?) often differ from those of Steller. The latter says that the flesh of the sea-otter is better than that of the seal, and a good antidote to scurvy. The flesh of the young sea-otter might even compete with lamb as a delicacy.

[2] To judge by what is stated in Steller's description of Behring Island (*Neue nord. Beytr.*, ii. p. 290) no one would have dared to attack "diese grimmigen Thiere," and the only sea-lion eaten during the winter was an animal wounded at Kamchatka and thrown up dead on the coast of Behring Island. The fin-like feet were the most delicate part of the sea-lion.

his commission, so that a new *St. Peter* was launched on the $\frac{21st}{10th}$ August, 1742. The vessel was forty feet long, thirteen feet beam, and six and a half feet deep, and sailed as well as if built by an experienced master of his craft, but on the other hand leaked seriously in a high sea. The return voyage at all events passed successfully. On the $\frac{5th\ September}{25th\ August}$ Kamchatka was sighted, and two days after the *St. Peter* anchored at Petropaulovsk, where the shipwrecked men found a store-house with an *abundant* stock of provisions according to their ideas, which probably were not pitched very high. Next year they sailed on with their Behring-Island-built vessel to Okotsk. On their arrival there, of the seventy-six persons who originally took part in the expedition, thirty-two were dead. At Kamchatka they had all been considered dead, and the effects they left behind them had been scattered and divided. Steller voluntarily remained some time longer in Kamchatka in order to carry on his researches in natural history. Unfortunately he drew upon himself the ill-will of the authorities, in consequence of the free way in which he criticised their abuses. This led to a trial at the court at Irkutsk. He was, indeed, found innocent, and obtained permission to travel home, but at Zolikamsk he was overtaken by an express with orders to bring him back to Irkutsk. On the way thither he met another express with renewed permission to travel to Europe. But the powers of the strong and formerly healthy man were exhausted by this hunting backwards and forwards across the immeasurable deserts of Siberia. He died soon after, on the $\frac{22nd}{12th}$ November, 1746, at Tjumen, only thirty-seven years of age, of a fever by which he was attacked during the journey.[1]

[1] According to Müller's official report, probably written for the purpose of refuting the rumours regarding Steller's fate current in the scientific circles of Europe. According to the biography prefixed to Georg Wilhelm Steller's *Beschreibung von dem Lande Kamtschatka, herausgegeben von J. B. S.* (Scheerer), Frankfurt and Leipzig, 1774, Steller had in 1745 begun

The immense quantity of valuable furs brought home by the survivors of Behring's so unfortunate third voyage affected the fur-dealers, Cossacks, and hunters of Siberia much in the same way as the rumour about Eldorado or about the riches of the Casic Dobaybe did the Spanish discoverers of middle and southern America. Numerous expeditions were fitted out to the new land rich in furs, where extensive territories previously unknown were made tributary to the Czar of Russia. Most of these expeditions landed on Behring Island during the voyage out and home, and in a short time wrought a complete change in the fauna of the island. Thanks to Steller's spirited sketch of the animal life he observed there, we have also an opportunity of forming an idea of the alteration in the fauna which man brings about in a land in which he settles.

Arctic foxes were found in incredible numbers on the island during the wintering of the Behring expedition. They not only ate up everything that was at all eatable that was left in the open air, but forced their way as well by day as by night into the houses and carried off all that they could, even such things as were of no use whatever to them, as knives, sticks, sacks, shoes and stockings. Even if anything had been never so well buried and loaded with stones, they not only found the place but even pushed away the stones with their shoulders like men. Though they could not eat what they found, they carried it off and concealed it under stones. In such a case some foxes stood on guard, and if a man approached all assisted in speedily concealing the stolen article in the sand so that no trace of it was left. When any of the men slept out of doors at night

his return to St. Petersburg, and was already beyond Novgorod, when he received orders to appear before the court at Irkutsk. After a year he obtained permission to travel to St. Petersburg, but when he came to the neighbourhood of Moscow, he received a new order to return, and for further security he was placed under a guard. They had travelled a good way into Siberia, when he froze to death while the guard went into a public-house to warm themselves and quench their thirst.

the foxes carried off their caps and gloves, and made their way under the covering. They nosed the noses of the sleepers to find out whether they were dead or living, and attempted to nibble at any who held their breath. As the female sea-lions and sea-bears often suffocate their young during sleep, the foxes every morning made an inspection of the place where these animals lie down in immense herds, and if they found a dead young one they immediately helped each other, like good scavengers, to carry away the carcase. When men were employed out of doors they had to drive the foxes away with sticks, and they became, in consequence of the slyness and cunning with which they knew how to carry out their thefts and the skill which they showed in combining to gain an end which they could not compass as single animals, actually dangerous to the shipwrecked men, by whom they were therefore heartily hated, pursued, tormented, and killed. Since then thousands and thousands of foxes have been killed on Behring Island by the fur-hunters. Now they are so scarce that during our stay there we did not see one. Those that still survive, besides, as the Europeans settled on the island informed me, do not wear the precious dark blue dress formerly common but the white, which is of little value. On the neighbouring Copper Island, however, there are still dark blue foxes in pretty large numbers.[1]

[1] As early as Schelechov's wintering at 1783-84 the foxes on Behring Island were principally white. During Steller's wintering, over a third of the foxes on the island had a bluish fur (*Neue nord. Beytr.*, ii. p. 277). In the year 1747-48 a fur hunter, Cholodilov, caught on Behring Island 1,481 blue foxes and 350 sea-otters, and the following year another hunter returned with over a thousand sea-otters and two thousand blue foxes, which probably were also caught on Behring and Copper Islands (*Neue Nachrichten von denen neuentdeckten Inseln*, Hamburg u. Leipzig, 1766, p. 20). In the year 1751-53 Jugov caught on the same island 790 sea-otters, 6,844 black and 200 white foxes, and 2,212 sea-bears (*loc. cit.* p. 22). In 1752-53 the crew of a vessel belonging to the Irkutsk merchant, Nikifor Trapeznikoff, caught on Behring Island 5 sea-otters, 1,222 foxes (colour not stated), and 2,500 sea-bears (*loc. cit.* p. 32). It thus appears as if the

Nine hundred sea-otters were killed here by Steller and his companions in 1741-42. The following quotation is taken from Steller's description of this animal which is now so shy at the sight of man :—

"With respect to playfulness it surpasses every other animal that lives either in the sea or on the land. When it comes up out of the sea it shakes the water from its fur, and dresses it as a cat its head with its fore-paws, stretches its body, arranges its hair, throws its head this way and that, contemplating itself and its beautiful fur with evident satisfaction. The animal is so much taken up with this dressing of itself, that while thus employed it may easily be approached and killed. If one strikes a sea-otter twenty times across the back, it bears it patiently, but if its large beautiful tail be struck once it turns its head to its pursuer, as if to offer it as a mark for his club in place of the tail. If it eludes an attack it makes the most laughable gestures to the hunter. It looks at him, placing one foot above the head as if to protect it from the sunlight, throws itself on its back, and turning to its enemy as if in scorn scratches itself on the belly and thighs. The male and female are much attached to each other, embrace and kiss each other like men. The female is also very fond of its young. When attacked she never leaves it in the lurch, and when danger is not near she plays with it in a thousand ways, almost like a child-loving mother with her young ones, throws it sometimes up in the air and catches it with her fore-feet like a ball, swims about with it in her bosom, throws it away now and then to let it exercise itself in the art of swimming, but takes it to herself with kisses and caresses when it is tired."

According to recent researches the *sea-otter*, sea-beaver or Kamchatka-beaver (*Enhydris lutris*, Lin.) is a species neither of the otter nor the beaver, but belongs to a peculiar genus, allied to a certain extent to the walrus. Even this animal, unsurpassed in the beauty of its skin, has been long since driven away not only from Behring Island but also from most of the

eager hunting had an influence not only on the number of the animals but also on their colour, the variety in greatest demand becoming also *relatively* less common than before.

hunting-grounds where it was commonly killed by thousands, and if an effective law be not soon put in force to keep the hunting in bounds, and check the war of extermination which greed now carries on against it, no longer with clubs and darts but with powder and breechloaders, the sea-otter will meet the same fate which has already befallen Steller's sea-cow. Of the sea-lion (*Eumetopias Stelleri*, Lesson), which in Steller's time were found in abundance on the shore cliffs of Behring Island, there are now only single animals there along with the sea-bears (*Otaria ursina*, Lin.); and finally, the most remarkable of all the old mammalia of Behring Island, the great sea-cow, is completely extinct.

Steller's sea-cow (*Rhytina Stelleri*, Cuvier) in a way took the place of the cloven-footed animals among the marine mammalia. The sea-cow was of a dark-brown colour, sometimes varied with white spots or streaks. The thick leathery skin was covered with hair which grew together so as to form an exterior skin, which was full of vermin and resembled the bark of an old oak. The full grown animal was from twenty-eight to thirty-five English feet in length and weighed about sixty-seven cwt. The head was small in proportion to the large thick body, the neck short, the body diminishing rapidly behind. The short fore-leg terminated abruptly without fingers or nails, but was overgrown with a number of short thickly placed brush-hairs; the hind-leg was replaced by a tail-fin resembling a whale's. The animal wanted teeth, but was instead provided with two masticating plates, one in the gum the other in the under jaw. The udders of the female, which abounded in milk, were placed between the fore-limbs. The flesh and milk resembled those of horned cattle, indeed in Steller's opinion surpassed them. The sea-cows were almost constantly employed in pasturing on the sea-weed which grew luxuriantly on the coast, moving the head and neck while so doing much in the same way as an ox. While they pastured they showed great voracity, and did not allow themselves to be

disturbed in the least by the presence of man. One might even touch them without their being frightened or disturbed. They entertained great attachment to each other, and when one was harpooned the others made incredible attempts to rescue it.

When Steller came to Behring Island, the sea-cows pastured along the shore, collected like cattle into herds. The shipwrecked men, for want of suitable implements, did not hunt them at first. It was only after a thoughtless love of slaughter had driven all other animals suitable for food far from their winter quarters, that they began to devise means to catch the sea-cow also. They endeavoured to harpoon the animal with a strong iron hook made for the purpose, and then drag it to land. The first attempt was made on the $\frac{\text{1st June,}}{\text{21st May,}}$ 1742, but it was unsuccessful. It was not until after many renewed attempts that they at last succeeded in killing and catching a number of animals, and dragging them at high water so near land that they were dry at ebb. They were so heavy that forty men were required to do this; we may conclude from these particulars that the number of sea-cows killed during the first wintering on Behring Island was not very large. For the first one was killed only six weeks before the shipwrecked men left the island, and the hunting thus fell at a time when they could leave the building of the vessel to occupy themselves in that way only in case of necessity. Besides, only two animals were required to yield flesh-food to all the men for the period in question.

It is remarkable that the sea-cow is so mentioned by later travellers only in passing, that this large animal, still hunted by Europeans in the time of Linnæus, would scarcely have been registered in the system of the naturalist if Steller had not wintered on Behring Island. What Krascheninnikov says of the sea-cow is wholly borrowed from Steller, and in the same way *nearly all* the statements of later naturalists as to its occurrence and mode of life. That this is actually the case is shown by the following abstract, *complete* as far as I know, of what is said of

the sea-cow in the only original account of the first hunting voyages of the Russians to the Aleutian Islands, which was published at Hamburg and Leipzig in 1776 with the title, *Neue Nachrichten von denen neuentdeckten Insuln in der See zwischen Asien und Amerika, aus mitgetheilten Urkunden und Auszügen verfasset von J. L. S * ** (Scherer).[1] In this book the sea-cow is mentioned at the following places:—

"Ivan Krassilnikoff's vessel started first in 1754 and arrived on the 8th October at Behring Island, where all the vessels fitted out for hunting the sea-otter on the remote islands are wont to pass the winter, in order to provide themselves with a sufficient stock of the flesh of the sea-cow" (*loc. cit.* p. 38).

"The autumn storms, or rather the wish to take on board a stock of provisions, compelled them (a number of hunters sent out by the merchant Tolstyk under command of the Cossack Obeuchov) to touch at Commander's Island (Behring Island) where, during the winter up to the $\frac{24}{15}$th June, 1757, they obtained nothing else than sea-cows, sea-lions, and large seals. They found no sea-otters this year" (*ibid.* p. 40).

"They (a Russian hunting vessel under Studenzov in 1758) landed on Behring Island to kill sea-cows, as all vessels are accustomed to do" (*ibid.* p. 45).

"After Korovin in 1762 (on Behring Island) had provided himself with a sufficient stock of the flesh and hides of the sea-cow for his boats .... he sailed on" (*ibid.* p. 82).

[1] From this little work, compiled from the original journals (Cf. Coxe, *Russian Discoveries*, 1780, p. vi.) we see that the undaunted courage and the resolution which, matched with other qualities not so praiseworthy, distinguished the *Promyschlenni* during their expeditions of exploration, tribute-collecting, and plunder from the Ob to Kamchatka, did not fail them in the attempt to force their way across the sea to America. It happens yearly that a ship's crew save themselves from destruction in the most extraordinary craft, for necessity has no law. But it is perhaps not so common that an exploring expedition, wrecked on an uninhabited treeless island, builds for itself of fragments from its own vessel, indeed even of driftwood, a new one in order to sail out on the ocean to discover new fishing-grounds or new wild tribes, willing to pay "jassak" to the adventurers. This however happened very frequently during the Russian voyages of discovery and hunting to the Aleutian Islands from 1745 to 1770, and it was remarkable that the craft built in this way were used for years, even after the return from the first voyage.

In 1772 DMITRI BRAGIN wintered on Behring Island during a hunting voyage. In a journal kept at the request of Pallas, the large marine animals occurring on the island are enumerated, but not a word is said about the sea-cow (PALLAS, *Neue nordische Beyträge*, ii. p. 310).

SCHELECHOV passed the winter 1783-84 on Behring Island, but during the whole time he only succeeded in killing some white foxes, and in the narrative of the voyage there is not a word about the sea-cow (GRIGORI SCHELECHOV *russischen Kaufmanns erste und zweite Reise*, &c., St. Petersburg, 1793).

Some further accounts of the sea-cow have been obtained through the mining engineer PET. JAKOVLEV, who visited Commander's Islands in 1755 in order to investigate the occurrence of copper on Copper Island. In the account of this voyage which he gave to Pallas there is not indeed one word about the sea-cow, but in 1867 PEKARSKI published in the *Memoirs* of the Petersburg Academy some extracts from Jakovlev's journal, from which it appears that the sea-cow already in his time was driven away from Copper Island. Jakovlev on this account on the 27th November, 1755, laid a petition before the authorities on Kamchatka, for having the hunting of the sea-cow placed under restraint of law and the extermination of the animal thus prevented, a thoughtful act honourable to its author, which certainly ought to serve as a pattern in our times (J. FR. BRANDT, *Symbolæ Sirenologicæ, Mém. de l'Acad. de St. Pétersbourg*, t. xii. No. 1, 1861-68, p. 295).

In his account of Behring's voyage (1785-94) published in 1802, Sauer says, p. 181: "Sea-cows were very common on Kamchatka and the Aleutian Islands,[1] when they were first

[1] The sea-cow does not appear to have ever occurred on the Aleutian Islands; on the other hand, according to Steller, dead sea-cows have sometimes been cast ashore on Kamchatka, where they even obtained from the Russians a peculiar name *kapustnik*, derived from the large quantity of sea-weed found in their stomach. It appears to me that this name, specially distinctive of a graminivorous animal, appears to indicate that on

discovered, but the last was killed on Behring Island in 1768, and none has been seen since then."

On the ground of the writings of which I have given an account above, and of various pieces of information collected during this century from the Russian authorities in the region, by the skilful conservator WOSNESSENSKI, the academicians von Baer and Brandt[1] came to the conclusion that the sea-cow had scarcely been seen by Europeans before the $\frac{19}{8}$th November, 1741, when Steller, the day after his landing on Behring Island, for the first time saw some strange animals pasturing with their heads under water on the shores of the island; and that the animal twenty-seven years afterwards, or in 1768, was completely exterminated. The latter statement however is undoubtedly incorrect; for, in the course of the many inquiries I made of the natives, I obtained distinct information that living sea-cows had been seen much later. A *creole* (that is, the offspring of a Russian and an Aleutian), who was sixty-seven years of age, of intelligent appearance and in the full possession of his mental faculties, stated "that his father died in 1847 at the age of eighty-eight. He had come from Volhynia, his native place, to Behring Island at the age of eighteen, accordingly in 1777. The two or three first years of his stay there, *i.e.* till 1779 or 1780, sea-cows were still being killed as they pastured on sea-weed. The heart only was eaten, and the hide used for *baydars*.[2] In consequence of its thickness the hide was split

the first arrival of the Russians at Kamchatka the sea-cow actually visited occasionally the coasts of that peninsula. It is probable that in former times the sea-cow was to be met with as far south as the north part of Japan. Some scientific men have even conjectured that the animal may have occurred north of Behring's Straits. This however is improbable. Among the mass of subfossil bones of marine animals which we examined at Pitlekaj the bones of the sea-cow did not appear to be present.

[1] Von Baer's and Brandt's numerous writings on the sea-cow are to be found in the publications of the St. Petersburg Academy.

[2] That the hide of the sea-cow was used for *baydars* is evident from the short extract given from Korovin's voyage. On hearing this "creole's"

in two, and the two pieces thus obtained had gone to make a *baydar* twenty feet long, seven and a half feet broad, and three feet deep. After that time no sea-cows had been killed."

There is evidence, however, that a sea-cow had been seen at the island still later. Two *creoles*, Feodor Mertchenin and Stepnoff, stated, that about twenty-five years ago at Tolstoj-mys, on the east side of the island, they had seen an animal unknown to them which was very thick before, but grew smaller behind, had small fore-feet, and appeared with a length of about fifteen feet above water, now raising itself up, now lowering itself. The animal "blew," not through blowholes, but through the mouth, which was somewhat drawn out. It was brown in colour with some lighter spots. A back fin was wanting, but when the animal raised itself it was possible, on account of its great leanness, to see its backbone projecting. I instituted a through examination of both my informants. Their accounts agreed completely, and appeared to have claims to be regarded as trustworthy. That the animal which they saw was actually a sea-cow, is clearly proved both by the description of the animal's form and way of pasturing in the water, and by the account of the way in which it breathed, its colour, and leanness. In *Aüsfurliche Beschreibung von sonderbaren Meerthieren*, Steller says, p. 97, "While they pasture, they raise every fourth or fifth minute their nose from the water in order to blow out air and a little water;" p. 98, "During winter they are so lean that it is possible to count their vertebræ and ribs;" and p. 54, "Some sea-cows have pretty large white spots and streaks, so that they have a spotted appearance." As these natives had no knowledge of Steller's description of the animal, it is impossible that their statement can be false. The death-year of the Rhytina race must therefore be altered at least

account I inquired whether there were not to be found remaining on the island any very old sea-cow skins that had been used for *baydars*, but the answer unfortunately was in the negative.

to 1854. With reference to this point it may be remarked that many circumstances indicate that the Rhytina herds were rather driven away from the rich pastures on Behring Island than exterminated there, and that the species became extinct because in their new haunt they were unable to maintain the struggle for existence. The form of the sea-cow, varying from that of most recent animals, besides indicates that, like the long-tailed duck on Iceland, the dront on Mauritius, and the large ostrich-like birds on New Zealand, it was the last representative of an animal group destined to extinction.

Mr. OSCHE, one of the Alaska Company's skin inspectors, a native of Liffland and at present settled on Copper Island, informed me that the bones of the sea-cow also occurred on the western side of that island. On the other hand, such bones are said not to be found on the small island described farther on lying off the colony on Behring Island, although Rhytina bones are common on the neighbouring shores of the main island.

This is the scanty information I have been able to collect from the natives and others resident in the quarter regarding the animal in question. On the other hand, my endeavours to procure Rhytina bones were crowned with greater success, and I succeeded in actually bringing together a very large and fine collection of skeleton fragments.

When I first made the acquaintance of Europeans on the island, they told me that there was little probability of finding anything of value in this respect; for the company had offered 150 roubles for a skeleton without success. But before I had been many hours on land, I came to know that large or small collections of bones were to be found here and there in the huts of the natives. These I purchased, intentionally paying for them such a price that the seller was more than satisfied and his neighbours were a little envious. A great part of the male population now began to search for bones very eagerly, and in this way I collected such a quantity that twenty-one casks, large boxes, or

SKELETON OF RHYTINA, SHOWN AT THE 'VEGA" EXHIBITION AT THE ROYAL PALACE, STOCKHOLM.

(After a photograph.

ORIGINAL DRAWINGS OF THE RHYTINA.

1. Drawing in an old map of the Behring Sea, found by Middendorff (*Sibir. Reise*, iv. 2, p. 839). 2. Sketch by Steller, given to Pallas (PALLAS, *Icones ad zoographiam Rosso-Asiaticam*, Fasc. ii.).

barrels were filled with Rhytina bones; among which were three very fine, complete skulls, and others more or less damaged, several considerable collections of bones from the same skeleton, &c.

The Rhytina bones do not lie at the level of the sea, but upon a strand-bank thickly overgrown with luxuriant grass, at a height of two or three metres above it. They are commonly covered with a layer of earth and gravel from thirty to fifty centimetres in thickness. In order to find them, as it would be too troublesome to dig the whole of the grassy bank, one must examine the ground with a pointed iron rod, a bayonet, or some such tool. One soon learns to distinguish, by the resistance and

RECONSTRUCTED FORM OF THE SEA-COW.
After J. Fr. Brandt (*Symbolæ Sirenologicæ*, Fasc. iii. p. 282).

nature of the sound, whether the rod stuck into the ground has come into contact with a stone, a piece of wood, or a fragment of bone. The ribs are used by the natives, on account of their hard ivory-like structure, for shoeing the runners of the sledges or for carvings. They have accordingly been already used up on a large scale, and are more uncommon than other bones. The finger-bone, which perhaps originally was cartilaginous, appears in most cases to be quite destroyed, as well as the outermost vertebræ of the tail. I could not obtain any such bones, though I specially urged the natives to get me the smaller bones too and promised to pay a high price for them.

The only large animal which is still found on Behring Island in perhaps as large numbers as in Steller's time is the *sea-bear*. Even it had already diminished so that the year's catch was inconsiderable,[1] when in 1871 a single company obtained for a payment to the Russian crown, if I recollect right, of two roubles for every animal killed, and exclusive right to the hunting, which was accordingly arranged in a more purposelike way. At certain times of the year the killing of the sea-bear is wholly prohibited. The number of the animals to be killed is settled beforehand, quite in the same way as the farmer at the time of killing in autumn is wont to do with his herd of cattle. Females and young are only killed exceptionally. Even the married males, or more correctly the males that can get themselves a harem and can defend it, commonly escape being killed, if not for any other reason, because the skin is too often torn and tattered and the hair pulled out. It is thus the bachelors that have to yield up their skins.

That a wild animal may be slaughtered in so orderly a way, depends on its peculiar mode of life.[2] For the sea-bears

[1] The number of these animals killed on Behring Island is shown by the following statement given me by Mr. Henry W. Elliot:

In the Year		In the Year		In the Year	
1867 ...	27,500	1872 ...	29,318	1877 ...	21,532
1868 ...	12,000	1873 ...	30,396	1878 ...	31,340
1869 ...	24,000	1874 ...	31,292	1879 ...	42,752
1870 ...	24,000	1875 ...	36,274	1880 ...	48,504
1871 ...	3,614	1876 ...	26,960		

During the eighteen years from 1862 to 1880 there have thus been shipped from Behring Island 389,462 skins. The catch on the Pribylov Islands has been still larger. These islands were discovered in 1786, but the number of animals killed there is not known for the first ten years; it is only known that it was enormously large. In the years 1797-1880—that is in eighty-four years—over three-and-a-half millions of skins have been exported from these islands. In recent years the catch has increased so that in each of the years from 1872 to 1880, 99,000 animals might have been killed without inconvenience.

[2] The traits here given of the sea-bear's mode of life are mainly taken from Henry W. Elliot's work quoted above.

are found year after year during summer at certain points

SEA-BEARS.
Male, Female, and Young.
(From a water-colour painting by H. W. Elliott.)

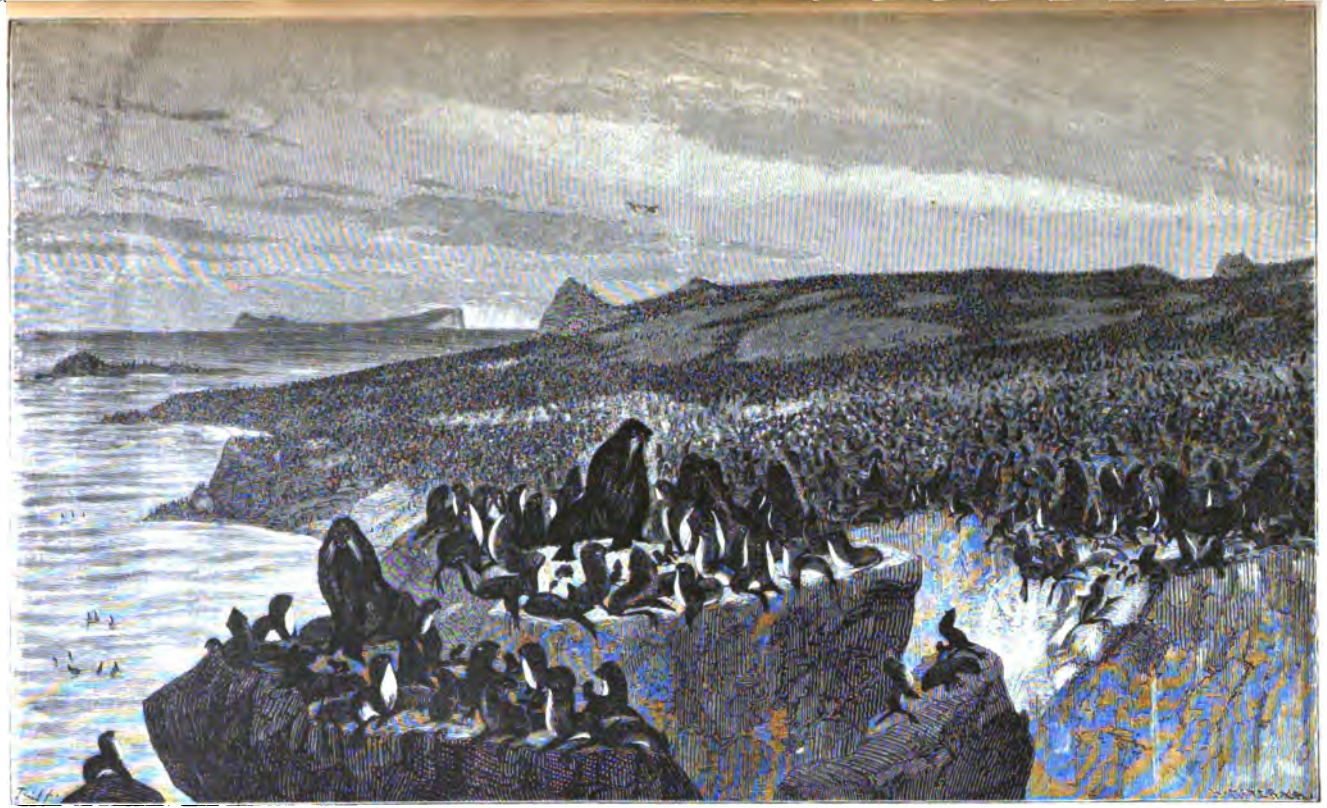
projecting into the sea (rookeries), where, collected in hundreds

of thousands, they pass several months without the least food. The males (oxen) come first to the place, most of them in the month of May or at the beginning of June. Combats of excessive violence, often with a deadly issue for one of the parties, now arise regarding the space of about a hundred square feet, which each seal-ox considers necessary for its home. The strongest and most successful in fight retain the best places near the shore; the weaker have to crawl farther up on land, where the expectation of getting a sufficient number of spouses is not particularly great. The fighting goes on with many feigned attacks and parades. At first the contest concerns the proprietorship of the soil. The attacked therefore never follows its opponent beyond the area it has once taken up, but haughtily lays itself down, when the enemy has retired, in order in the arms of sleep to collect forces for a new combat. The animal in such a case grunts with satisfaction, throws itself on its back, scratches itself with its fore-feet, looks after its toilet, or cools itself by slowly fanning with one of its hind-feet, but it is always on the alert and ready for a new fight until it is tired out and meets its match, and is driven by it farther up from the beach. One of the most peculiar traits of these animals is that during their stay on land they unceasingly use their hind-paws as fans, and sometimes also as parasols. Such fans may on a warm day be in motion at the same time by the hundred thousand at a "rookery."

In the middle of June the females come up from the sea. At the water's edge they are received in a very accommodating way by some strong oxen that have succeeded in securing for themselves places next the shore, and now are bent by fair means or foul on annexing the fair for their harem. But scarcely is the female that has come up out of the water established with seal-ox No. 1, when this ox rushes towards a new beauty on the surface of the water. Seal-ox No. 2 now stretches out his neck and without ceremony lays hold of No. 1's spouse,

to be afterwards exposed to a repetition of the trick by No. 3. In such cases the females are quite passive, never fall out with each other, and bear with patience the severe wounds they often get when they are pulled about by the combatants, now in one direction, now in another. All the females are finally distributed in this way after furious combats among the males, those of the latter who are nearest the beach getting from twelve to fifteen consorts to their share. Those that have been compelled to settle farther from the shore must be content with four or five. Soon after the landing of the females they bring forth their young, which are treated with great indifference and are protected by the adopted father only within the boundaries of the harem. Next comes the pairing season, and when it has passed there is an end to the arrangement and distribution into families at first so strictly maintained. The seal-oxen, rendered lean by three months absolute fasting, by degrees leave the "rookery," which is taken possession of by the sea-cows, the young, and a number of young males, that have not ventured to the place before. In the middle of September, when the young have learned to swim, the place is quite abandoned, with the exception of single animals that have remained behind for one reason or other. In long continued heavy rain many of the animals besides seek protection in the sea, but return when the rain ceases. Continuous heat and sunshine besides exert the same influence; cold, moist air, with mist-concealed sun, on the other hand draw them up on land by thousands.

Males under six years of age cannot, like the older males, possess themselves, by fighting, of spouses and a home of their own. They therefore collect, along with young females, in herds of several thousand to several hundred thousand, on the shores between the rookeries proper, some of them close packed next the water's edge, others scattered in small flocks a little farther from the shore on the grass, where they by turns play with each



"SEAL-ROOKERY" ON ST. PAUL'S ISLAND, ONE OF THE PRIBYLOV ISLANDS.
(After a drawing by H. W. Elliott.

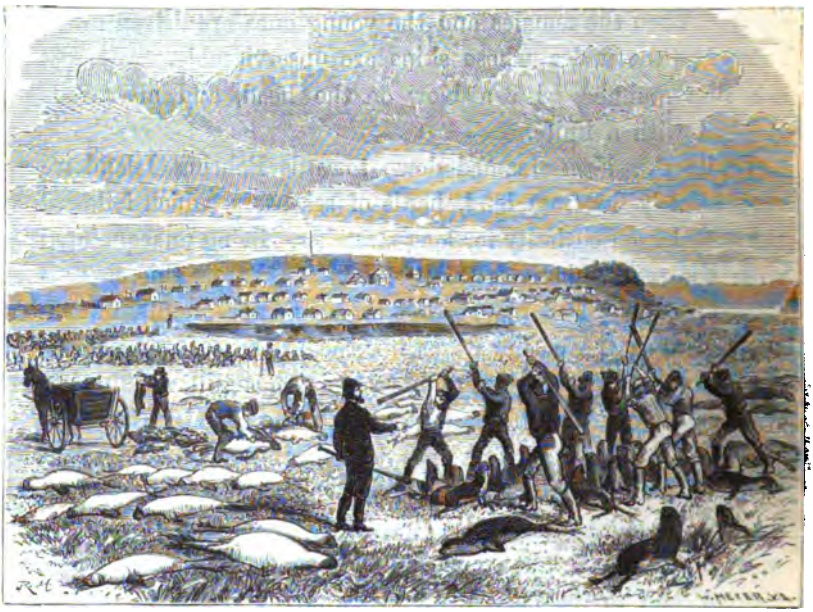
other with a frolicsomeness like that of young dogs, by turns lie down to sleep at a common signal in all conceivable positions.

It is these unfortunate useless bachelors which at the properly managed hunting stations yield the contingent for slaughter. For this purpose they are driven by the natives from the shore slowly, about a kilometre an hour, and with frequent rests, to the place of slaughter, situated a kilometre or two from the shore. Then the females and the young ones are driven away, as well as the males whose skins are unserviceable. The rest are first stunned with a blow on the head, and afterwards stabbed with a knife.

While the *Vega* steamed down towards Behring Island we met, already far from land, herds of sea-bears, which followed the vessel from curiosity for long stretches. Being unacquainted with the sea-bear's mode of life, I believed from this circumstance that they had already left their summer haunts, but on our arrival at the colony I was informed that this was not the case, but that a very great number of animals still remained at the rookery on the north-eastern point of the island. Naturally one of our first excursions was to this place, situated about twenty kilometres from the village. Such a journey cannot now be undertaken alone and unattended, because even an involuntary want of caution might easily cause much economic loss to the natives, and to the company that owns the right of hunting. During the journey we were accordingly accompanied by the chief of the village, a black-haired stammering Aleutian, and "the Cossack," a young, pleasant, and agreeable fellow, who on solemn occasions wore a sabre nearly as long as himself, but besides did not in the least correspond to the Cossack type of the writers of novels and plays.

The journey was performed in large sledges drawn by ten dogs over snow-free rounded hills and hill-plateaus covered with a rather scanty vegetation, and through valleys treeless

as the mountains, but adorned with luxuriant vegetation, rich in splendid lilies, syngenesia, umbellifera, &c. The journey was sometimes tedious enough, but we now and then went at a whistling rate, especially when the dog-team descended the steep mountain slopes, or went through the morasses and the clay puddles formed in the constantly used way. The driver was bespattered from top to toe with a thick layer of mud, an inconvenience



SLAUGHTER OF SEA-BEARS.
(After a drawing by H. W. Elliott.)

attending the unusual team, which was foreseen before our departure from the colony, in consequence of which our friends there urged that, notwithstanding the fine weather, we should all take overcoats. The dog-team was kept pretty far from the shore in order not to frighten the seals, and then we went on foot to the place where the sea-bears were, choosing

our way so that we had the wind in our faces. We could in this way, without disturbing them, come very near the animals, which, according to the undoubtedly somewhat exaggerated statement made to us on the spot, were collected at the time to the number of 200,000, on the promontory and the neighbouring shores. We obtained permission to creep, accompanied by our guide, close to a herd lying a little apart. The older animals became at first somewhat uneasy when they

SEA-BEARS ON THEIR WAY TO THE "ROOKERIES."
(After a drawing by H. W. Elliott.)

observed our approach, but they soon settled down completely, and we had now the pleasure of beholding a peculiar spectacle. We were the only spectators. The scene consisted of a beach covered with stones and washed by foaming breakers, the background of the immeasurable ocean, and the actors of thousands of wonderfully-formed animals. A number of old males lay still and motionless, heedless of what was going on around them. Others crept clumsily on their small short legs between

the stones of the beach, or swam with incredible agility among the breakers, played, caressed each other, and quarrelled. At one place two old animals fought, uttering a peculiar hissing sound, and in such a way as if the attack and defence had been carried out in studied attitudes. At another place a feigned combat was going on between an old and a young animal. It looked as if the latter was being instructed in the art of fighting. Everywhere the small black young ones crept constantly backwards and forwards among the old sea-bears, now and then bleating like lambs calling on their mothers. The young ones are often smothered by the old, when the latter, frightened in some way, rush out into the sea. After such an alarm hundreds of dead young are found on the shore.

"Only" thirteen thousand animals had been killed that year. Their flayed carcases lay heaped on the grass by the shore, spreading far and wide a disagreeable smell, which, however, had not frightened away their comrades lying on the neighbouring promontory, because, even among them, a similar smell prevailed in consequence of the many animals suffocated or killed in fight with their comrades, and left lying on the shore.[1] Among this great flock of sea-bears sat enthroned on the top of a high stone a single sea-lion, the only one of these animals we saw during our voyage.

For a payment of forty roubles I induced the chief of the village to skeletonise four of the half putrefied carcases of the sea-bear left lying on the grass; and I afterwards obtained, by the good-will of the Russian authorities, and without any payment, six animals, among them two living young, for stuffing. Even the latter we were compelled to kill, after

[1] Elliott (*loc. cit.* p. 150) remarks that not a single self-dead seal is to be found in the "rookery," where there are so many animals that they probably die of old age in thousands. This may he explained by the seals, when they become sick, withdrawing to the sea, and forms another contribution to the question of the finding of self-dead animals to which I have already referred (vol. i. p. 322).

in vain attempting to induce them to take some food. One of them was brought home in spirits for anatomical examination.

The part of Behring Island which we saw forms a high plain resting on volcanic rocks,[1] which, however, is interrupted at many places by deep kettle valleys, the bottoms of which are generally occupied by lakes which communicate with the sea by large or small rivers. The banks of the lakes and the slopes of the hills are covered with a luxuriant vegetation, rich in long grass and beautiful flowers; among them an iris cultivated in our gardens, the useful dark reddish-brown Sarana lily, several orchids, two species of rhododendron with large flowers, umbellifera as high as a man, sunflower-like synanthea, &c. Quite another nature prevailed on the island lying off the haven, regarding which Dr. Kjellman and Dr. Stuxberg make the following statements:—

"Toporkoff Island is formed of an eruptive rock, which everywhere rises along the shore some scores of feet from high-water mark, in the form of steep cracked walls from five to fifteen metres in height, which is different at different places. Above these steep rock-walls the surface of the island forms an even plain; what lies below them forms a gently sloping beach.

"This gently sloping beach consists of two well-marked belts; an outer devoid of all vegetation, an inner overgrown with *Ammadenia peploides*, *Elymus mollis*, and two species of umbellifera, *Heracleum sibiricum*, and *Angelica archangelica*, the two last forming an almost impenetrable thicket fifty metres broad and as high as a man, along the slope. The steep rock-walls are coloured yellow at some places by lichens, mostly *Caloplaca murorum* and *Cal. crenulata;* at other places they are covered pretty closely with *Cochlearia fenestrata*. The uppermost level plain is covered with a close and luxuriant turf, over which

[1] According to a statement by Mr. Grebnitski, tertiary fossils and coal seams are also to be found on Behring Island, the former north of the colony in the interior, the latter at the beach south of Behring's grave. Also in the neighbourhood of the colony the volcanic rock-masses are under-stratified by thick sandy beds.

single stalks of the two species of umbellifera named above raise themselves here and there. The vegetation on this little island unites a very uncommon poverty in species with a high degree of luxuriance.

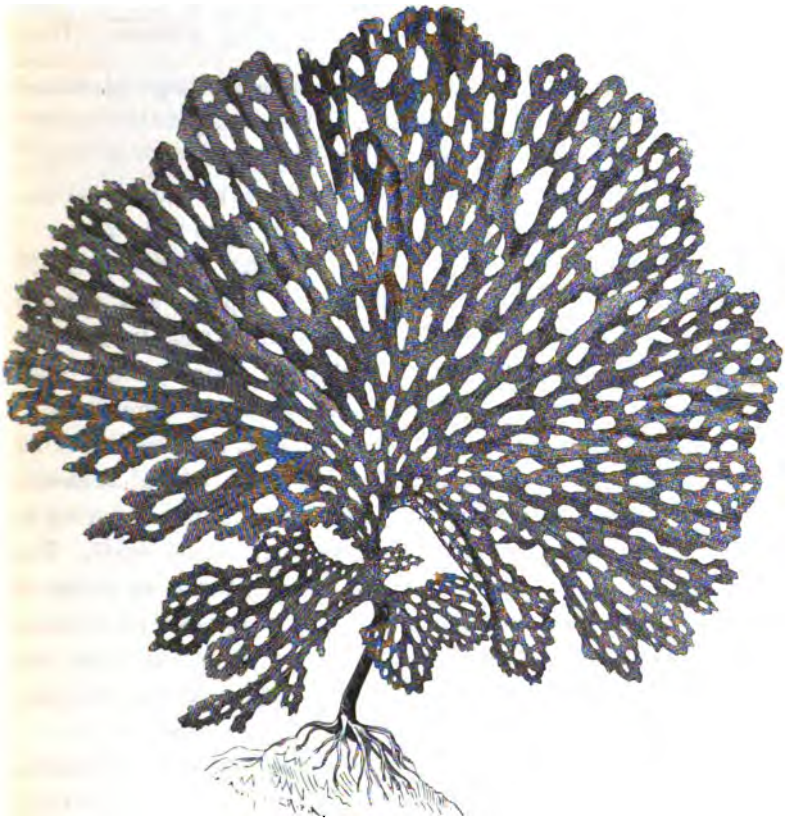
"Of the higher animals we saw only four kinds of birds, viz. *Fratercula cirrhata*, a black guillemot (*Uria grylle* var. *columba*), a species of cormorant (Phalocrocorax) and a sort of gull (Larus). *Fratercula cirrhata* lived here by millions. They haunted the upper plain, where they had everywhere excavated short, deep, and uncommonly broad passages to sleep in, provided with two openings. From these on our arrival they flew in large flocks to the neighbouring sea and back. Their number was nearly equal to that of looms in the Arctic loomeries. The black guillemots and cormorants kept to the cliffs near the shore.

"The number of the evertebrate land animals amounted to about thirty species. The most numerous were Machilis, Vitrina, Lithobius, Talitrus, some Diptera and beetles. They all lived on the inner belt of the shore, where the ground was uncommonly damp."

Behring Island might without difficulty feed large herds of cattle, perhaps as numerous as the herds of sea-cows that formerly pastured on its shores. The sea-cow besides had chosen its pasture with discrimination, the sea there being, according to Dr. Kjellman, one of the richest in algæ in the world. The sea-bottom is covered at favourably situated places by forests of seaweed from twenty to thirty metres high, which are so dense that the dredge could with difficulty force its way down into them, a circumstance which was much against the dredging. Certain of the algæ are used by the natives as food.

In the course of our journey to the hunting place we had an opportunity, during a rest about halfway between it and the village, of taking part in a very peculiar sort of fishing. The place where we rested was in an even grassy plain, resembling a natural meadow at home, crossed by a large number of small rivulets. They abounded in several different kinds of fish, among them a Coregonus, a small trout, a middle-sized long salmon with almost white flesh, though the colour of its skin

was a purplish-red, another salmon of about the same length, but thick and hump-backed. These fish were easily caught. They were taken with the hand, were harpooned with common unshod sticks, were stabbed with knives, caught with the insect



ALGA FROM THE SHORE OF BEHRING ISLAND.
Thalassiophyllum Clathrus, Post. and Rupr.
One-fourth of the natural size.

net, &c. Other kinds of salmon with deep red flesh are to be found in the large rivers of the island. We obtained here for a trifle a welcome change from the preserved provisions of which

we had long ago become quite tired. The Expedition was also presented by the Alaska Company with a fine fat ox, milk, and various other provisions, and I cannot sufficiently value the goodwill shown to us not only by the Russian official, N. GREBNITSKI, a zealous and skilful naturalist, but also by the officials of the Alaska Company and all others living on the island with whom we came into contact.

It was my original intention to sail from Behring Island to Petropaulovsk, in order from thence to put a stop to the undertakings which were possibly in contemplation for our relief. This however became unnecessary, because a steamer, which was to start for Petropaulovsk as soon as its cargo was on board, had anchored by the side of the *Vega* two days after our arrival. The steamer belonged to the Alaska Company, was named the *Alexander*, was commanded by Captain SANDMAN, and was manned almost exclusively by Swedes, Danes, Fins, and Norwegians.[1] We found on the *Alexander* two naturalists, Dr. BENEDIKT DYBOVSKI and Dr. JULIAN WIEMUT. The former is a Pole exiled to Siberia but now pardoned, whose masterly zoological works are among the best contributions which have been made during recent decades to our knowledge of the natural conditions of Siberia. His researches have hitherto mainly concerned the Baikal region. Now he wishes to extend them to Kamchatka, and has therefore voluntarily taken a physician's post at Petropaulovsk. Science has reason to expect very rich results from his work and that of his companions in one of the most interesting, most mis-known, and least known lands of the north.

[1] The first European who welcomed us after the completion of the North-east passage was a Fin now settled in California, from Björkboda works in Kimito parish, in which I had lived a great deal when a youth. He was sent by the Alaska Company to do some work on Behring Island. As we steamed towards the colony he rowed to meet us, and saluted us with the cry "är det Nordenskiöld?" ("Is it Nordenskiöld?") His name was Isak Andersson.

The *Vega* left Behring Island on the afternoon of the 19th August, and anchored at Yokohama on the evening of the 2nd September. The first part of the passage, while we were still in the cold northerly Polar Sea current, was favoured by fair winds and moderate heat. The surface temperature of the sea was from +9° to +10°. On the 25th August in 45° 15′ N.L. and 156° E.L. from Greenwich the temperature of the sea-water began to rise so rapidly that the thermometer in 40° Lat. and 147° 41′ Long. already showed +23°·4 at the surface. This indicated that we had come from the cold current favourable to us into Kuro-sivo, the Gulf Stream of the Pacific. The wind was now at times unfavourable and the heat oppressive, notwithstanding the frequent rain showers accompanied by lightning and heavy squalls. In such unfavourable weather on the 31st August the mainmast of the *Vega* was struck by lightning, the flash and the report being of excessive violence. The vane was broken loose and thrown into the sea along with some inches of the pole. The pole itself was split pretty far down, and all on board felt a more or less violent shaking, the man who felt it most standing at the time near the hawse-hole. The incident was not attended by any further noteworthy unpleasant consequences.

On our arrival at Yokohama we were all in good health and the *Vega* in excellent condition, though, after the long voyage, in want of some minor repairs, of docking, and possibly of coppering. Naturally among thirty men some mild attacks of illness could not be avoided in the course of a year, but no disease had been generally prevalent, and our state of health had constantly been excellent. Of scurvy we had not seen a trace.

CHAPTER XVI.

Arrival at Yokohama—A Telegram sent to Europe—The stranding of the steamer *A. E. Nordenskiöld*—*Fêtes* in Japan—The Minister of Marine, Kawamura—Prince Kito-Shira-Kava—Audience of the Mikado—Graves of the Shoguns—Imperial Garden at Tokio—The Exhibition there—Visit to Enoshima—Japanese manners and customs—Thunberg and Kämpfer.

YOKOHAMA, the first harbour, telegraph station, and commercial town at which the *Vega* anchored after circumnavigating the north coast of Asia, is one of the Japanese coast cities which were opened to the commerce of the world after the treaty between the United States of America and Japan negotiated by Commodore PERRY.[1] At this place there was formerly only a little fishing village, whose inhabitants had never seen Europeans and were forbidden under severe punishments from entering into communication or trading with the crews of the foreign vessels that might possibly visit the coast. The former village is now, twenty years later, changed into a town of nearly 70,000 inhabitants, and consists not only of Japanese, but also of very fine European houses, shops, hotels, &c. It is also the residence of the governor of Kanagava *Ken*. It is in communication by rail with the neighbouring capital Tokio, by regular weekly

[1] The Dutch had permission in former times to send some vessels annually to Nagasaki. By Perry's treaty, signed on the 31st March, 1854, Shimoda and Hakodate were opened to the Americans. Finally, by new treaties with the United States and various European powers, the harbours Kanagava (Yokohama), Nagasaki, Hakodate, Niigata, Hiogo, and Osaka, were assigned for commerce with foreigners.

steamship sailings with San Francisco on the one hand, and Hong Kong, India, &c., on the other, and finally by telegraph not only with the principal cities of Japan but also with all the lands that have got entangled in the threads of the world's telegraph net.

The situation of the town on the western shore of the Yedo or Tokio Bay, which is perhaps rather large for a haven, is not particularly fine. But on sailing in we see in the west, if the weather be fine, Fusiyama's snow-clad, incomparably beautiful volcanic cone raise itself from a cultivated forest-clad region. When one has seen it, he is no longer astonished that the Japanese reproduce with such affection on their varnished wares, porcelain, cloth, paper, sword-ornaments, &c., the form of their highest, stateliest, and also grimmest mountain. For the number of the men who have perished by its eruptions is reckoned by hundreds of thousands, and if tradition speaks truth the whole mountain in a far distant antiquity was formed in a single night. Before we enter Yedo Bay we pass a volcano, active during last year, situated on the volcanic island Oshima, known in Japanese history as the place of exile of several of the heroes in the many internal struggles of the country.

While we sailed, or more correctly, steamed—for we had still sufficient coal remaining to permit the engine to be used—up the Bay of Yedo, the coasts were for the most part concealed with mist, so that the summit of Fusiyama and the contours of the shore only now and then gleamed forth from the fog and cloud. The wind besides was against us, on which account it was 9.30 in the evening of the 2nd September before we could anchor in the haven that had been longed-for for such a length of time. I immediately hastened on land, along with Captain Palander, in order to send home a telegram across Siberia about the fortunate issue of the voyage of the *Vega*. At the telegraph station I was informed that the Siberian line was interrupted by inundations for a space of 600 versts, and that

the telegram must therefore be sent by India, whereby the cost was nearly doubled. The telegraph officials also made difficulties about taking the foreign gold coin of various kinds which I had about me. Fortunately the latter difficulty was immediately removed by the accidental presence of the Russian consul, Mr. PELIKAN, while I was treating with the telegraph officials. When he heard that it concerned the sending home of a telegram from the much-talked-of *Vega* expedition, he immediately offered to arrange the affair until I had time to operate on the letter of credit I carried with me from Messrs. James Dickson & Co. of Gothenburg. Soon after I met with the Swedish consul, Mr. VAN OORDT, who gave us a large parcel of letters from home. It was very gladly received by most of us, as, so far as I know, it did not bring the thirty members of the expedition a single unexpected sorrowful message. I got, however, soon after landing, an unpleasant piece of news, viz. that the steamer *A. E. Nordenskiöld*, which Mr. Sibiriakoff had sent to Behring's Straits and the Lena to our relief, had stranded on the east coast of Yesso. The shipwreck fortunately had not been attended with any loss of human life, and the vessel lay stranded on a sandbank in circumstances which made it probable that it would be got off without too great cost.

As the report of our arrival spread, I was immediately waited upon by various deputations with addresses of welcome, invitations to *fêtes*, clubs, &c. A series of entertainments and festivities now began, which occupied a great part of the time we remained in this splendid and remarkable country. Perhaps a sketch of these festivities may yield a picture of Japan during the state of transition which still prevails there, and which in a decade or two will undoubtedly belong to a past and to a great extent forgotten period, a picture which to future writers may possibly form a not unwelcome contribution to the knowledge of the Japan that now (1879) is. Such a sketch would however carry me too far beyond the subject of this narrative of

FUSIYAMA.

travel, and require too much space, on which account I must confine myself to an enumeration of the festivities at the head of which were public authorities, learned societies, or clubs.

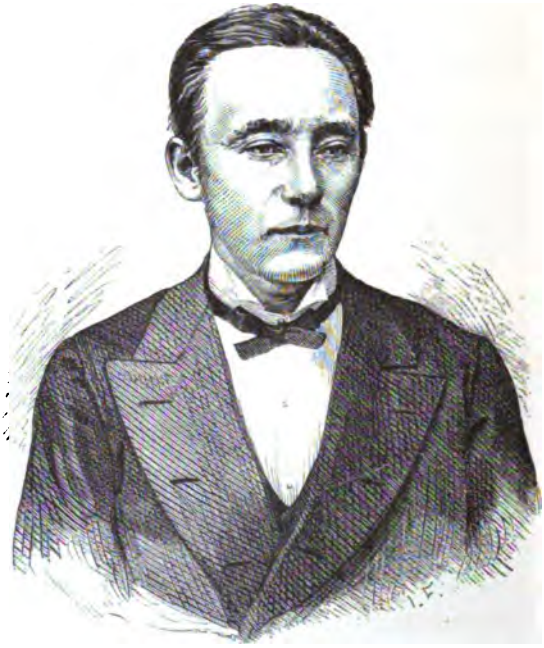
On the 10th September a grand dinner was given at the Grand Hotel, the principal European hotel—and very well kept—of Yokohama, by the Dutch minister, Chevalier VAN STOETWEGEN, who at the same time represents Sweden and Norway in Japan.

THE STEAMER "A. F. NORDENSKIÖLD," STRANDED ON THE EAST COAST OF YEZO.
(After a Japanese photograph.)

The members of the Expedition were here introduced to several members of the Japanese Government.

We were invited to a *déjeûner à la fourchette*, at one o'clock P.M. on the 11th September, at the Imperial summer palace Hamagoten, by Admiral KAWAMURA, minister of marine. At this entertainment there were present, besides the scientific men

and officers of the *Vega*, and our minister, Herr van Stoetwegen, several of the ministers and highest officials of Japan. Some of them spoke one or other of the European languages, others only Japanese, in which case officials of lower rank acted as interpreters, these however taking no part in the entertainment along with the other guests. It was arranged after the European



KAWAMURA SUMIYOSHI.
Japanese Minister of Marine.

pattern, with abundance of dishes and wines. The palace consisted of a one-storied wooden house in the Japanese style of construction. The rooms, to which we were admitted, were provided with European furniture, much the same as we would expect to find in the summer residence of a well-to-do family in Sweden. It was remarkable that the Japanese did not take

the trouble to ornament the room or the table to any considerable extent with the beautiful native bronzes or porcelain, of which there is such abundance in the country. The summer palace was surrounded by a garden which the Japanese consider something very extraordinary, and also on a very large scale. We should call it a small, well and originally kept miniature park, with carefully dressed turf, wonderful dwarf trees, miniature stone bridges, small ponds and waterfalls. The entertainment was very pleasant, and all, from our intelligent host to the Premier, Daiyo-daiyin, and the Imperial Prince, SANYO SANITOMI, showed us much friendliness. The latter looked a sickly young man, some years past twenty. He was, however, much older, and had taken a leading part in the most important political transactions since the opening of the ports. Our host, Admiral Kawamura, had more the appearance of a man of science than of a warrior. The modest exterior, however, concealed a great and noble man. For Kawamura, as commander of the Mikado's troops, had with special distinction brought about the suppression of the revolt under the brave Saigo Kichinosuke, who had at the restoration of the power of the Mikado been its heart and sword, but soon after fell before the government he himself contributed to create, and is now, a couple of years after, admired and sung by former friends and by former enemies as a national hero. All the Japanese present at the *déjeûner* were clad in European dress—in black dress coat and white tie. Even the interpreters and attendants wore the European dress. The people, the lower officials, and the servants in private houses are still clothed in the Japanese dress, but do not wear a sword, which is now prohibited. Many of the people have even exchanged the old troublesome Japanese dressing of the hair for the convenient European style.

In the course of conversation after the *déjeûner* the ministers offered to do all they could to make our stay in the country agreeable and instructive. Distinguished foreigners are always

well received in Japan, and we are informed that a special committee is appointed to make arrangements for their reception. This has given offence in certain quarters, and shortly before our arrival a proclamation was issued by a secret society, which threatened, if no change were made, to kill one of the ministers and one of the foreigners who were entertained in this, in the opinion of the secret society, extravagant way. One of my Japanese friends promised me a copy of the proclamation, but did not keep his promise, probably because it was impossible for the uninitiated to get hold of the dangerous writing.

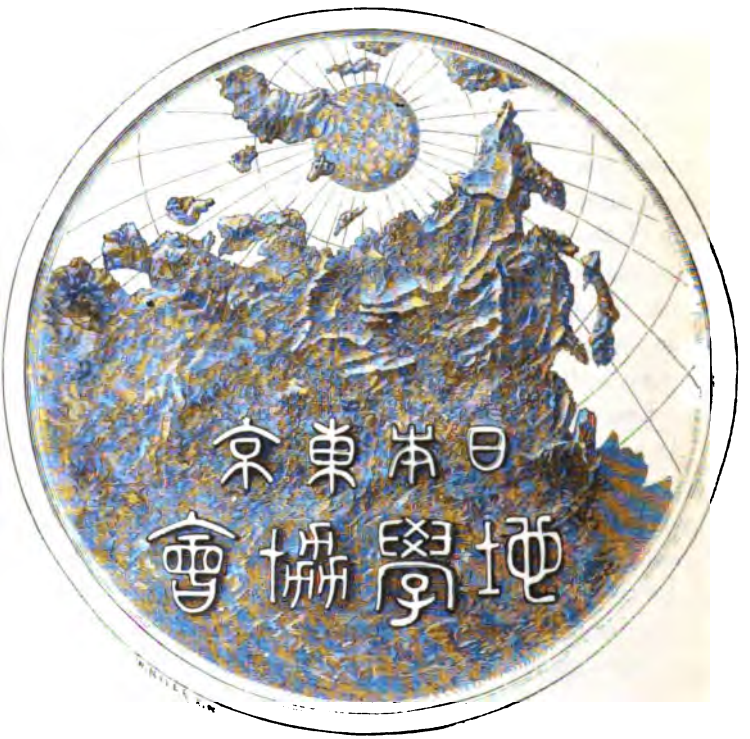
On the 13th September a grand dinner was arranged for us by the German Club, the photographer ANDERSEN being chairman. The hall was adorned in a festive manner with flags, and with representations of the *Vega* in various more or less dangerous positions among the ice, which had been got up for the occasion; the bill of fare had reference to the circumstances of our wintering, &c. A number of speeches were made; the feeling was cheerful and merry.

On the 15th September there was a grand entertainment in Tokio, given by the Tokio Geographical Society, the Asiatic Society of Japan, and the German Asiatic Society. It was held in the great hall in Koku-Dai-Gaku, a large stone building surrounded with beautiful trees, which were lighted up for the occasion by a number of variegated paper lanterns. Several Japanese ladies dressed in European style took part in the entertainment. I sat by the side of the chairman, Prince KITA-SHIRA-KAVA, a young member of the imperial house, who had served some time in the German army and speaks German very well. During the disturbances which were caused by the removal of the residence from Kioto to Yedo (Tokio), a group of insurgents had seized the prince, then a minor, who under the name of RINNOJINO-MIYA was chief priest in a temple, and endeavoured to set him up in opposition

to the Emperor. The plan failed, and in consequence of the reconciliation at the end of the conflict, which distinguished in so honourable a way the many involved and bloody political struggles in Japan during recent years, this adventure was attended with no other result for him than that the former chief priest was sent to a German military school. He was recalled sooner than was intended because he wished to marry a European, which was considered below the dignity of the family of the Mikado. After his return he was declared nearest heir to the throne, in case the Mikado should die without male heirs, and his name, KITA-SHIRA-KAVA-NO-MIYA, was changed a second time to YOHI HISHA. The former name was at the bottom of the speech he made for us at the dinner, and which he gave me, and the latter, with the addition, "Prince of Japan," was on his calling card. The dinner was quite European, with a large number of speeches, principally in European languages, but also in Japanese. Before every guest lay a map, of the form of a fan, with the course of the *Vega* marked upon it. As a memorial of the feast I received some days after a large medal in silver inlaid in gold, of which a drawing is given on pages 306, 307. We were conveyed back to the Tokio railway station in European equipages, in the same way as we had been brought to the dinner. During dinner musicians from the band of the imperial navy played European pieces of music with great skill, to the evident satisfaction of the Japanese.

On the forenoon of the 17th September we were presented at the court of the Mikado in Tokio by the Swedish-Dutch minister. We were fetched from the railway station by imperial equipages, consisting of simple but ornamental and convenient *suflett* carriages, each drawn by a pair of beautiful black horses of no great size. As is common in Japan, a running groom, clad in black, accompanied each carriage. The reception took place in the imperial palace, a very modest wooden

building. The rooms we saw were furnished, almost poorly, in European fashion. We first assembled in an antechamber, the only remarkable ornament of which was a large piece of nephrite, which was a little carved and had a Chinese inscription on it. Here we were met by some of the ministers and the



THE FIRST MEDAL WHICH WAS STRUCK AS A MEMORIAL OF THE VOYAGE OF THE "VEGA."
Size of the original.

interpreter. After a short conversation, in the course of which the interpreter got a sight of the written speech, or more correctly the words of salutation, I was to speak, we were conducted into an inner apartment where the Emperor, clad in a uniform of European style and standing in front of a

throne, received us. The only thing unusual at our reception was that we were requested at our departure not to turn our backs to the Emperor, and on entering and departing to make three bows, one at the door, another when we had come forward a little on the floor, and one at the place

THE FIRST MEDAL WHICH WAS STRUCK AS A MEMORIAL OF THE VOYAGE OF THE "VEGA."
Size of the original.

where we were to stand. After we had been presented the Emperor read a speech in Japanese, which was translated into French by the interpreter, and of which, before we left the place, a beautiful copy was given me. I then read my salutation, on which our minister, van Stoetwegen, said a few

words, and got some words in reply. After leaving the imperial chamber, we were entertained in the anteroom with Japanese tea and cigars. The two princes who had taken part in the entertainment of the 15th came and talked a little with us, as did the minister of foreign affairs. The Emperor MUTSUHITO, in whose name reforms have been carried out in Japan to an extent to which history can scarcely show anything equal, was born the 3rd November, 1850. He is considered the 121st Mikado of the race of Jimmu Tenno, the members of which have reigned uninterruptedly in Japan for nearly two thousand years, with varying fates and with varying power—now as wise lawgivers and mighty warriors, now for long periods as weak and effeminate rulers, emperors only in seeming, to whom almost divine homage was paid, but who were carefully freed from the burden of government and from all actual power. In comparison with this race, whose first ancestor lived during the first century after the foundation of Rome, all the royal houses now reigning in Europe are children of yesterday. Its present representative does not look to be very strong. During the whole audience he stood so motionless that he might have been taken for a wax figure, if he had not himself read his speech. Prince Kita-Shira-Kava has the appearance of a young lieutenant of hussars. Most of the ministers have sharply marked features,[1] which remind one of the many furious storms they have survived, and the many personal dangers to which they have been exposed, partly in honourable conflict, partly through murderers' plots. For, unfortunately, a political murder is not yet considered in Japan an infamous crime, but the murderer openly acknowledges his deed and takes the consequences. Repeated

[1] At first it strikes a European as if all the Japanese had about the same appearance, but when one has got accustomed to the colour of the skin and the traits of the race, the features of the Japanese appear as various in form and expression as those of Europeans.

murderous attempts have been made against the men of the new time. In order to protect themselves from these, ministers, when they go out, generally have their carriages surrounded by an armed guard on horseback.

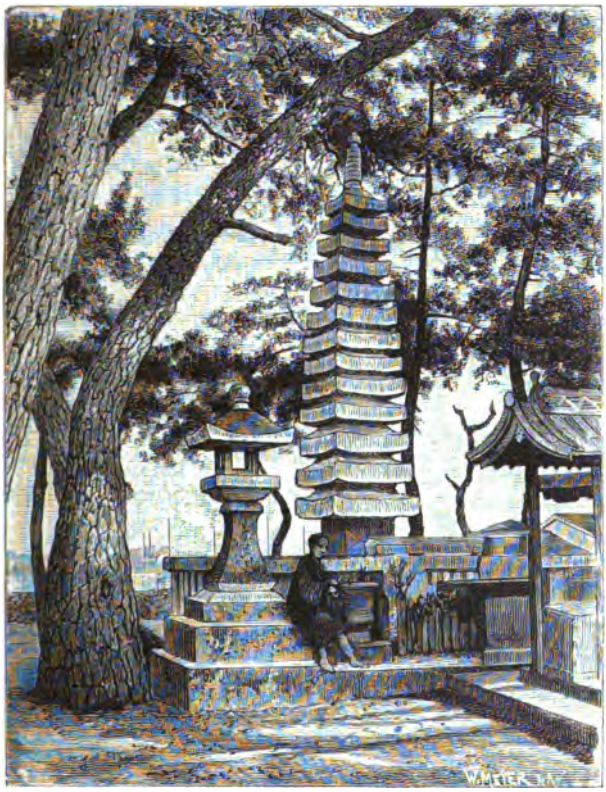
On the 18th September several of the members of the *Vega* expedition were invited to a *déjeûner à la fourchette* by Admiral Kawamura, minister of marine. This entertainment had an interest for us because we were here for the first time received into a Japanese home. I sat at table by the side of Lady Kawamura. Even the children were present at the entertainment. Lady Kawamura was dressed in the Japanese fashion, tastefully but very plainly, if we except a heavy gold chain encircling the waist. In other respects the entertainment was arranged according to the European mode, with a succession of dishes and wines, both in abundance, according to the laws of gastronomy. When it was over our host offered us an airing in a carriage, during which I rode with the lady and one of the children, a little girl about ten years of age, who would have been very beautiful if she had not been disfigured, in the eyes of Europeans, by the thick white paint that was evenly spread over her whole face, and gave it a sickly appearance. Lady Kawamura herself was not painted, nor was she disfigured with blackened teeth. Most of the married women of Japan are accustomed after marriage to blacken their formerly dazzlingly white teeth; but it is to be hoped that this unpleasant custom will soon disappear, as the women of distinction have begun to abandon it. During this excursion we visited, among other places, the graves of the Tycoons, the imperial garden, and a very remarkable exhibition in the capital.

A number of the Tycoons, or, as they are more correctly called, Shoguns, are buried in Tokio. Their place of sepulture is one of the most remarkable memorials of Old Japan. The graves are in a temple which is divided into several courts, surrounded by walls and connected with each other by beautiful

gates. The first of these courts is ornamented with more than two hundred stone lanterns, presented to the temple by the feudal princes of the country, the name of the giver and the date at which it was given being inscribed on each. Some of these peculiar memorials are only half-finished, perhaps an evidence of the sudden close of the power of the Shoguns and the feudal princes in Japan. In another of the temple courts are to be seen lanterns of bronze, partly gilt, presented by other feudal princes. A third court is occupied by a temple, a splendid memorial of the old Japanese architecture, and of the antique method of adorning their sanctuaries with wooden carvings, gilding, and varnishing. The temple abounds in old book-rolls, bells, drums, beautiful old lacquered articles, &c. The graves themselves lie within a separate inclosure.

The common Japanese gardens are not beautiful according to European taste. They are often so small that they might without inconvenience, with trees, grottos, and waterfalls, be accommodated in a small State's department in one of the crystal palaces of the international exhibitions. All, passages, rocks, trees, ponds, yea, even the fishes in the dams, are artificial or artificially changed. The trees are, by a special art which has been very highly developed in Japan, forced to assume the nature of dwarfs, and are besides so pruned that the whole plant has the appearance of a dry stem on which some green clumps have been hung up here and there. The form of the gold fish swimming in the ponds has also been changed, so that they have often two or four tail-fins each, and a number of growths not known in their natural state. On the walks thick layers of pebbles are placed to keep the feet from being dirtied, and at the doors of dwelling-houses there is nearly always a block of granite with a cauldron-like depression excavated in it, which is kept filled with clean water. Upon this stone cauldron is placed a simple but clean wooden scoop, with which one can take water out of the vessel to wash himself with.

The imperial garden in Tokio is distinguished from these miniature gardens by its greater extent, and by the trees, at least at most places, bearing fruit. There is here a veritable park, with uncommonly large, splendid, and luxuriantly-growing trees.



STONE LANTERN AND STONE MONUMENT.
In a Japanese Temple Court.

The public is generally excluded from the garden. At our visit we were entertained in one of the imperial summer-houses with Japanese tea, sweetmeats, and cigars.

Last of all we visited the Exhibition. It had been closed for

some time back on account of cholera. We saw here a number of beautiful specimens of Japanese art, from the flint tools and pottery of the Stone Age to the silks, porcelain, and bronzes of the present. In no country is there at this day such a love for exhibitions as in Japan. There are small exhibitions in most of the large towns. Many were exceedingly instructive; in all there were to be seen beautiful lacquered wares, porcelain,

JAPANESE HOUSE IN TOKIO.

swords, silk, cloths, &c. In one I saw a collection of the birds and fishes of Japan, in another I discovered some vegetable impressions, by means of which I became acquainted with the remarkable locality for fossil plants at Mogi, of which I shall give an account farther on.

On the evening of the 18th September I was invited by the Danish consul, Herr BAVIER, to a boat excursion up the river

which debouches at Tokio. At its mouth it is very broad and deep, and it branches somewhat farther up into several streams which are navigable by the shallow boats of the Japanese. With the present limited development of roads and railways in Japan, this river and its tributaries form the most important channels of communication between the capital and the interior of the country. During our row we constantly met with boats laden with provisions on their way to, or with goods on their way from, the town. The pleasant impression of these and of the remarkable environs of the river is sometimes disturbed by a bad odour coming from a passing boat, and reminding us of the care with which the Japanese remove human excreta, the most important manure of their well-cultivated land. Along the banks of the river there are numerous restaurants and tea-houses. At long intervals we see a garden on the banks, which has belonged to some of the former Daimio palaces. The restaurants and tea-houses are generally intended only for the Japanese; and Europeans, although they pay many times more than the natives, are not admitted. The reason of this is to be found in our manners, which are coarse and uncultivated in the eyes of the natives. "The European walks with his dirty boots on the carpets, spits on the floor, is uncivil to the girls, &c." Thanks to the letters of introduction from natives acquainted with the restaurant-keepers, I have been admitted to their exclusive places, and it must be admitted that everything there was so clean, neat, and orderly, that even the best European restaurants cannot compare with them. When a visitor enters a Japanese restaurant which is intended exclusively for the Japanese, he must always take off his boots at the stair else he gets immediately into disfavour. He is received with bended knee by the host and all the attendants, male, but principally female; and then he is almost always surrounded by a number of young girls constantly laughing and chattering. These girls have commonly sold themselves to the restaurant-keeper for a certain time, during which they

carry on a life which, according to European standards of morality, is not very commendable. When the time fixed in the agreement has passed, they return to their homes and marry, without having sunk in any way in the estimation of their relatives. But those are unfortunate who, in any of the towns that are not yet opened to foreigners, carry on a love intrigue with a European.

JAPANESE LADY AT HER TOILETTE.

They are then openly pointed out, even in the newspapers, as immoral, and their respectability is helplessly gone. Formerly they were even in such cases severely punished.

All women of the lower classes, and even most of the higher, wear the Japanese dress. The more distinguished ladies are often exceedingly beautiful, they have in particular beautiful

necks. Unfortunately they are often disfigured by paint, for which the ladies here appear to have a strong liking. The dress of the younger women, even among the poor, is carefully attended to; it is not showy but tasteful, and nearly the same for all classes. Their manners are very attractive and agreeable. The women of the upper classes already begin to take part in the social life of the Europeans, and all European gentlemen and ladies with whom I have conversed on this point agree in stating that there is no difficulty in the way of a Japanese woman leaving the narrow circle to which she was formerly confined, and entering with pleasure and womanly dignity into European society. She appears to be born "a lady."

On the 20th and 21st September the Governor of Yokohama had arranged an excursion for me, Dr. Stuxberg, and Lieut. Nordquist, to the sacred island or peninsula Enoshima, situated at a short distance from the town. We first travelled some English miles along the excellent road Tokaido, one of the few highways in Japan passable in carriages. Then we travelled in *jinrikishas* to the famous image of Buddha (Daibutsu) at Kamakura,[1] and visited the Shinto chief priest living in the neighbourhood and his temple.

The priest was fond of antiquities, and had a collection, not very large indeed, but composed almost entirely of rarities. Among other things he showed us sabres of great value, a head ornament consisting of a single piece of nephrite which he valued at 500 *yen*,[2] a number of old bronzes, mirrors, &c. We were received as usual with Japanese tea and sweetmeats. The priest himself took us round his temple. No images were to be seen here, but the walls were richly carved and ornamented with a number of drawings and gildings. The innermost wall

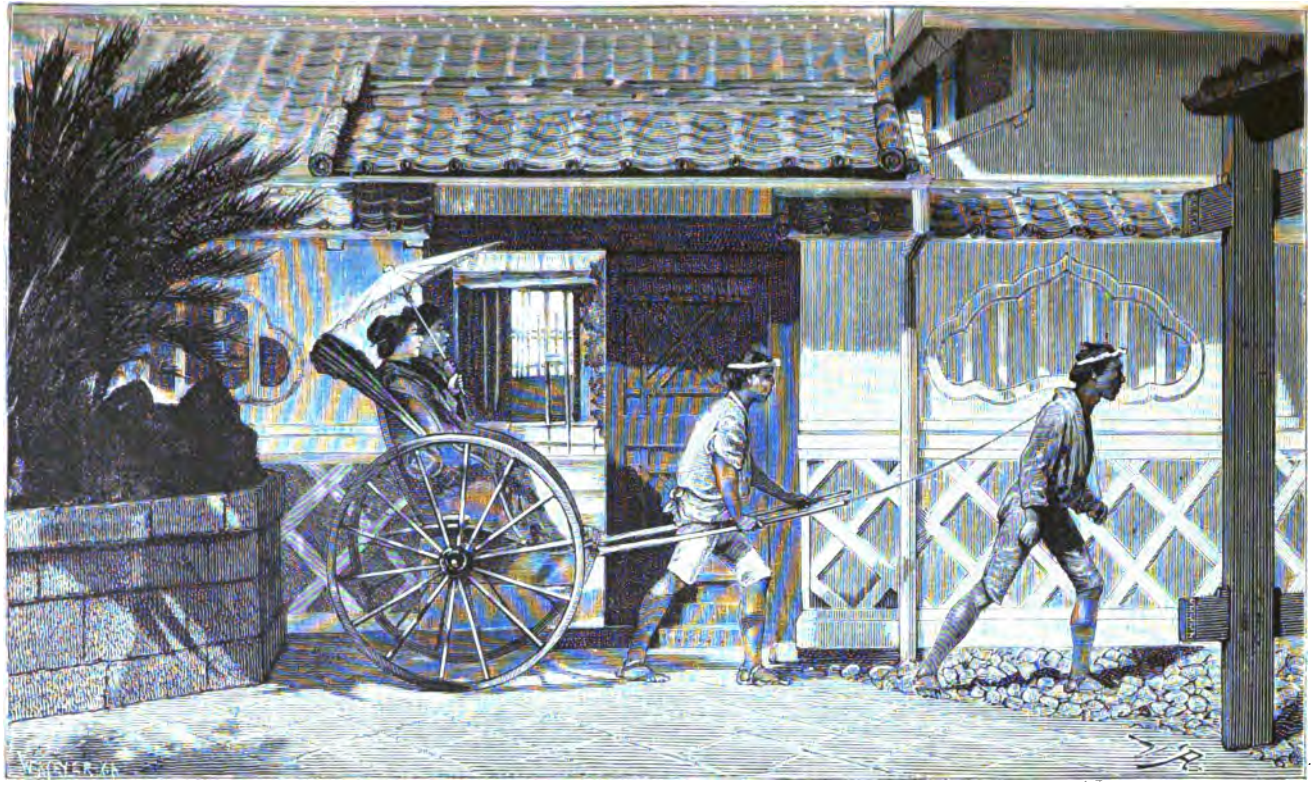
[1] At the close of the twelfth century this now inconsiderable town was the residence of Joritomo, the founder of the Shogun power, and the arranger of the Japanese feudal system.

[2] Five *yen* are about equal to £1 sterling.

of the temple was fenced by heavy doors provided with secure locks and bolts, within which "the divine spirit dwelt," or within which "there was nothing else," as the priest phrased it on another occasion.

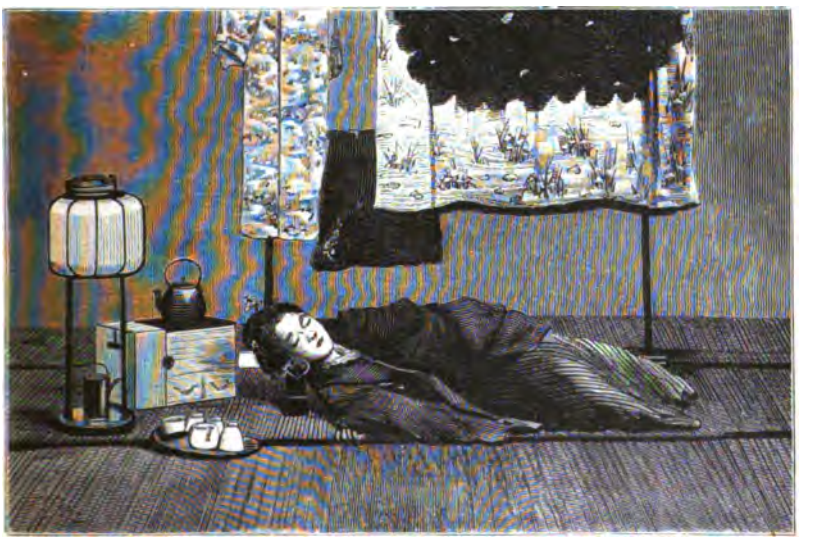
Enoshima is a little rocky peninsula, which is connected with the mainland by a low, sandy neck of land. Occasionally this neck of land has been broken through or overflowed, and the peninsula has then been converted into an island. It is considered sacred, and is studded with Shinto temples. On the side of the peninsula next the mainland there is a little village, consisting of inns, tea-houses, and shops for pilgrims' and tourists' articles, among which are beautiful shells, and the fine siliceous skeleton of a sponge, *Hyalonema mirabilis*, Gray. Here I lived for the first time in a Japanese inn of the sort to which Europeans in ordinary circumstances are not admitted. I was accompanied by two officials from the governor's court at Yokohama, and it was on their assurance that I did not belong to the common sort of uncultivated and arrogant foreigners that the host made no difficulty in receiving us.

After we had at our entrance saluted the people of the inn and passed some time in the exchange of civilities, there came a girl, and, in a kneeling posture, offered the foreigners Japanese tea, which is always handed round in very small cups only half full. Then we took off our shoes and went into the guest-chamber. Such chambers in the Japanese inns are commonly large and dazzlingly clean. Furniture is completely wanting, but the floor is covered with mats of plaited straw. The walls are ornamented with songs suitable for the place, or mottoes, and with Japanese paintings. The rooms are separated from each other by thin movable panels, which slide in grooves, which can be removed or replaced at will. One may, therefore, as once happened to me, lay himself down to sleep in a very large room, and, if he sleeps sound, awake in the morning in a very small one. The room generally looks out on a Japanese garden-inclosure, or



A JINRIKISHA.

if it is in the upper story, on a small balcony. Immediately outside there is always a vessel filled with water and a scoop. Generally on one side of the room there is a wall-press, in which the bed-clothes are kept. These, the only household articles in the room, consist of a thick mat, which is spread on the floor, a round cushion for the head, or instead of it a wooden support, stuffed on the upper side, for the neck during sleep, and a thick stuffed night-shirt which serves as covering.



JAPANESE BEDROOM.

As soon as one comes in the female attendants distribute four-cornered cushions for sitting on, which are placed on the floor round a wooden box, on one corner of which stands a little brazier, on the other a high clay vessel of uniform breadth, with water in the bottom, which serves as a spittoon and tobacco-ash cup. At the same time tea is brought in anew, in the small cups previously described, with saucers, not of porcelain, but of metal. Pipes are lighted, and a lively conversation commences. Along

with the tea sweetmeats are brought in, of which, however, some cannot be relished by Europeans. The brazier forms the most important household article of the Japanese. Braziers are very variable in size and shape, but are often made in an exceedingly beautiful and tasteful way, of cast-iron or bronze, with gilding and raised figures. Often enough, however, they consist only of a clay crock. The Japanese are very skilful in keeping up fire in them without the least trace of fumes being perceptible in the room. The fuel consists of some well-burned pieces of charcoal, which lie imbedded in white straw-ashes, with which the fire-pan is nearly filled to the brim. When some glowing coals are laid in such ashes they retain their heat for hours, until they are completely consumed. In every well-furnished house there are a number of braziers of different sizes, and there are often four-cornered hatches in the floor, which conceal a stone foundation intended as a base for the large brazier, over which the food is cooked.

At meal-times all the dishes are brought in at the same time on small lacquered tables, about half a foot high, and with a surface of four square feet. The dishes are placed in lacquered cups, less frequently in porcelain cups, and carried to the mouth with chop-sticks, without the help of knife, fork, or spoon. For fear of the fish-oils, which are used instead of butter, I never dared to test completely the productions of the Japanese art of cookery; but Dr. Almquist and Lieut. Nordquist, who were more unprejudiced, said they could put up with them very well. The following *menu* gives an idea of what a Japanese inn of the better class has to offer:—

Vegetable soup.
Boiled rice, sometimes with minced fowl.
Boiled fish or raw fish with horse-radish.
Vegetables with fish-sauce.
Tea.

Soy is used to the fish. The rice is brought in hot in a

wooden vessel with a lid, and is distributed in abundance, but the other dishes in extremely small portions. After meals, especially in the evening, the Japanese often drink warm *saki*, or rice-brandy, out of peculiar porcelain bottles and small cups set apart for that purpose alone.

During the meal one is commonly surrounded by a numerous *personnel* of female attendants, squatted down on the floor, who keep up with the guest, if he understands their language, a lively conversation, interrupted by salvoes of hearty laughter. The girls remain while the man undresses in the evening, and permit themselves to make remarks on the difference of the *physique* of the Europeans and Japanese, which are not only, in our way of thinking, unsuitable for young girls, but even impertinent towards the guest. The male attendants are seldom seen, at least in the inner apartments. In the morning one washes himself in the yard or on the balcony, and if he wishes to avoid getting into disfavour, the guest will be careful not to spill anything or spit on the mat.

The Japanese tobacco-pipe now in use resembles that of the Chukches, is very small, and is smoked out in a couple of whiffs. A Japanese smokes without stopping a score of pipes in succession. Tobacco-smoking is now very general among high and low of both sexes. It was introduced at the close of the sixteenth century, it is uncertain whether from Corea or from the Portuguese possessions in Asia, and spread with great rapidity. As among us, it here too at first gave occasion to stringent prohibitions, and a lively exchange of writings for and against. In a work by the learned Japanologist, Mr. E. M. SATOW ("The Introduction of Tobacco into Japan," *Transactions of the Asiatic Society of Japan*, vol. vi. part i. p. 68), the following statements among others are made on this subject:—

"In 1609 there were in the capital two clubs whose main delight was to contrive quarrels with peaceful citizens. Upwards of fifty of the members of these clubs were suddenly arrested

and thrown into prison; but justice was satisfied when four or five of the leaders were executed, the rest were pardoned. As these societies were originally smoking clubs, the tobacco-plant came by the bad behaviour of their members into disrepute, and its use was prohibited. At that time tobacco was smoked in long pipes, which were stuck in the belt like a sword, or carried after the smoker by an attendant. In 1612 a proclamation was

TOBACCO SMOKERS.
Japanese drawing.

published in which tobacco-smoking and all trade in tobacco were prohibited, under penalty of forfeiture of estate. The prohibition was repeated several times, with as little success as in Europe."

Mr. Satow further gives the following peculiar extracts

from a Japanese work, which enumerates the advantages and disadvantages that are connected with tobacco-smoking:—

"*A.*—ADVANTAGES.

"1. It dispels the vapours and increases the energies.
"2. It is good to produce at the beginning of a feast.
"3. It is a companion in solitude.
"4. It affords an excuse for resting now and then from work, as if in order to take breath.
"5. It is a storehouse of reflection, and gives time for the fumes of wrath to disperse.

"*B.*—DISADVANTAGES.

"1. There is a natural tendency to hit people over the head with one's pipe in a fit of anger.[1]
"2. The pipe comes sometimes to be used for arranging the burning charcoal in the brazier.
"3. An inveterate smoker has been known to walk about among the dishes with his pipe in his mouth.
"4. People knock the ashes out of their pipes while still alight and forget to extinguish the fire.
"5. Hence clothing and mats are frequently scorched by burning tobacco ash.
"6. Smokers spit indiscriminately in braziers, foot-warmers, and kitchen fires.
"7. Also in the crevices between the floor-mats.
"8. They rap the pipe violently on the edge of the brazier.
"9. They forget to have the ash-pot emptied till it is full to overflowing.
"10. They use the ash-pot as nose-paper (*i.e.* they blow their nose into the ash-pot)."

As during our stay at Enoshima as the governor's guests we were constantly attended by two officials from his court, I considered it my duty to show myself worthy of the honour by a liberal distribution of drink-money. This is not given to the attendants,

[1] The Japanese pipes are now so small that no serious results from this disadvantage are to be dreaded. In former times the pipes used were long and probably heavy. The Dyaks of Borneo still use pipes so heavy that they may be used as weapons.

but is handed, wrapped up in paper, and accompanied by some choice courteous expressions, to the host himself. He on his part makes a polite speech with apologies that all had not been so well arranged as his honoured guest had a right to expect. He accompanies the traveller on his departure a shorter

ITO-KESKE.
A Japanese Editor of Thunberg's writings.

or longer distance in proportion to the amount of drink-money and the way in which his guest has behaved.

It is a specially praiseworthy custom among the Japanese to allow the trees in the neighbourhood of the temples to stand untouched. Nearly every temple, even the most inconsiderable,

is therefore surrounded by a little grove, formed of the most splendid pines, particularly Cryptomeria and Ginko, which often wholly conceal the small, decayed, and ill-kept wooden hut which is dedicated to some of the deities of Buddha or Shinto.

On the 23rd September the Europeans and Japanese of Yokohama gave a dinner and ball for us in the hall of the English club. It was beautifully lighted and decorated. Among other things there were to be seen on a wall portraits of Berzelius

MONUMENT TO THUNBERG AND KAEMPFER AT NAGASAKI.

and Thunberg, surrounded by garlands of greenery. The latter has a high reputation in Japan. His work on the flora of the country has lately been published in a Japanese edition with a wood-cut portrait, by no means bad, of the famous Swedish naturalist,[1] engraved in Japan; and a monument to his and

[1] The work bears the title : *Tai-sei-hon-zo-mei-so* (short list of European plant-names), by Ito-Keske, 1829, 3 vols.

Kämpfer's memory is to be found at Nagasaki, erected there at the instance of von Siebold.[1] The chairman of the feast was Dr. GEERTZ, a Dutchman, who had lived a long time in the country and published several valuable works on its natural productions.

On the 26th September I started for Tokio, in order thence to undertake a journey proposed and arranged by the Danish consul, Herr Bavier, to Asamayama, a yet active volcano in the interior of the country. In consequence of an unexpected death among the European consuls at Yokohama, Herr Bavier, however, could not join us until the day after that which had been fixed for our departure. The 27th accordingly was passed in Tokio among other things, in seeing the beautiful collections of antiquities made by the *attaché* of the Austrian legation, Herr H. VON SIEBOLD, son of the famous naturalist of the same name. Japan has also, like most other lands, had its Stone Age, from which remains are found at several places in the country, both on Yezo and on the more southerly islands. Implements from this period are now collected assiduously both by natives and Europeans, and have been described by H. von Siebold in a work accompanied by photographic illustrations. In general the implements of the Japanese stone folk have a resemblance to the stone tools still in use among the Eskimo, and even in this fruitful land the primitive race, as the bone remains in the kitchen-middens show, lived at first mainly by hunting and fishing.

[1] Carl Peter Thunberg, born at Jönköping in 1743, famed for his travels in South Africa, Japan, &c., and for a number of important scientific works, finally Professor at Upsala, died in 1828. Engelbert Kämpfer, born in Westphalia in 1651, was secretary of the embassy that started from Sweden to Persia in 1683. Kämpfer, however, did not return with the embassy, but continued his travels in the southern and eastern parts of Asia, among them, even to Japan, which he visited in 1690-92; he died in 1716. Kämpfer's and Thunberg's works, together with the great work of von Siebold, who erected the monument to them, form the most important sources of the knowledge of the Japan that once was.

CHAPTER XVII.

Excursion to Asamayama—The Nakasendo road—Takasaki—Difficulty of obtaining quarters for the night—The Baths at Ikaho—Massage in Japan—Swedish matches—Travelling in *Kago*—Savavatari—Criminals—Kusatsu—The Hot Springs and their healing power—Rest at Roku-riga-hara—The summit of Asamayama—The descent—Journey over Usui-toge—Japanese actors—Pictures of Japanese folk-life—Return to Yokohama.

On the 28th September, early in the morning, accompanied by Lieut. Hovgaard, Herr Bavier, an interpreter, and a Japanese cook skilled in European cookery, I started on a journey to Asamayama. At first we travelled in two very rattling and inconvenient carriages, drawn each by a pair of horses, to the town Takasaki, situated on the great road "Nakasendo," which passes through the interior of the country and connects Tokio and Kioto. This road is considered something grand by the Japanese. In Sweden it would be called an indifferently kept district road. On this road *jinrikishas* are met in thousands, and a great many horses, oxen, and men, *bearing* heavy burdens, but with the exception of the posting carriages, by which, for some years back, a regular communication between Tokio and Takasaki has been kept up, not a single wheeled vehicle drawn by horses or oxen; and though the road passes through an unbroken series of populous villages, surrounded by well cultivated rice fields and small gardens, there is not a single work-horse or work-ox to be seen. For all the ground in Japan is cultivated by the hand, and there are few cattle.

Most of the roads in the country consist of foot-paths, so narrow that two laden horses can pass each other only with difficulty. Goods are therefore carried, where there is no canal or river, for the most part by men. The plains are extraordinarily well cultivated, and we must specially admire the industry with which water-courses have been cut and the uneven slopes changed into level terraces.

The post-horses on Nakasendo were so poor and wretched that in Sweden one would have been liable to punishment for cruelty to animals for using them. They went, however, at a pretty good speed. There were places for changing horses at regular distances of fifteen to twenty kilometres. The driver besides halted often on the way at some dwelling-house to take a couple of scoopfuls of water out of the water-vessel standing before it and throw them into the horses' mouths and between their hind-legs. The opportunity was always taken advantage of by the girls of the house to come out and offer the travellers a small cup of Japanese tea, an act of courtesy that was repaid with some friendly words and a copper coin.

When we visited any of the peasants' gardens by the wayside we were always received with extreme friendliness, either on a special dais in the common room looking to the road, or in an inner room whose floor was covered with a mat of dazzling whiteness, and on whose walls hung pictures, with songs and mottoes. The brazier was brought forward, tea and sweetmeats were handed round, all with lively conversation and frequent bows. The difference between the palace of the rich (if we may distinguish with the name any building in Japan) and the dwelling of the less well-to-do is much smaller here than in Europe. We did not see any beggars in our journey into the interior of the country.[1] Nor did the distinction of class appear to be so sharp as might be expected in a land where the evils of rank

[1] On the contrary, we saw a number of beggars on the country roads in the neighbourhood of Yokohama.

had been so great as in Old Japan. We several times saw in the inns by the roadside, people of condition who were travelling in *jinrikishas* eat their rice and drink their *saki* together with the coolies who were drawing their vehicles.

To judge by the crowds of children who swarmed everywhere along the roads the people must be very prolific. A girl of eight or ten years of age was seldom to be seen without another young one bound on her back. This burden did not appear to trouble the sister or attendant very much. Without giving herself any concern about the child or thinking of its existence, she took part actively in games, ran errands, &c.

Even in the interior of the country foreigners are received with great friendliness. The lower classes in Japan have also reason for this, for whatever influence the latest political changes may have had on the old *kuge*, *daimio*, and *samurai* families of Japan, the position of the cultivator of the soil is now much more secure than before, when he was harried by hundreds of small tyrants. His dress is the same as before, with the exception, however, that a great proportion of the male population, even far into the interior, have laid aside the old troublesome way of collecting the hair in a knot over a close shaven spot on the crown of the head. Instead, they wear their thick raven-black hair cut short in the European style. How distinctive of the new period this change is may be seen from the eagerness with which the Japanese authorities questioned GOLOVIN about the religious and political revolutions which they assumed to have been connected with the change in the European mode of wearing the hair during the commencement of the nineteenth century; for the Russian ambassador LAXMAN, who was highly esteemed by the Japanese, had worn a pig-tail and powdered hair, while Golovin and his companions had their hair unpowdered and cut short.[1] When it is warm the workmen

[1] *Voyage de M. Golovin*, Paris, 1818, i. p. 176. Golovin, who was captain in the Russian navy, passed the years 1811-13 in imprisonment in

wear only a small, generally light-blue, girdle round the waist and between the legs. Otherwise they are naked. They are thus seen to be in many cases strongly tattooed over the greater part of the body. I have not seen the women working naked. They perhaps do so at the warmest season of the year. At least they do not refrain from undressing completely while bathing right in the midst of a crowd of men known and unknown, a state of things which at first, in consequence of the power of prejudice, shocks the European, but to which even the former prude gets accustomed sooner than one would suppose. We even frequently see European ladies drawn in a *jinrikisha* by a youth completely naked with the exception of the blue girdle. Many, especially of the younger men, have besides so well-formed a body, that the sculptor who could accurately reproduce it in marble would at once attain a reputation co-extensive with the globe.

Takasaki is the residence of a governor, with a population of about 20,000; but, like most of the towns of Japan, it differs little from many of the villages we passed through. We arrived late in the evening, and there had our first and last experience of an inconvenience of which Europeans often complain in travelling in Japan, and to which they have themselves given occasion by the offensive way in which they not unfrequently behave. We knocked at the door of one inn after another without being received. At one place "the house was full," at another "the rooms were under repair," at a third "the inn people were out," &c. At last we had to apply to the police. When we had shown them our passport, we succeeded with their help in getting a night's lodging with an elderly host, who received us with a countenance which clearly indicated that he would rather

Japan. He and his comrades in misfortune were received with great friendliness by the people, and very well treated by the authorities, if we except the exceedingly tedious examinations to which they were subjected to extract from them the most minute particulars regarding Europe, and particularly Russia.

have hewn us in pieces with one of the two swords he had formerly as *samurai* been entitled to wear, than received us under his roof. After our entrance he still turned to the police official with the cry of lamentation: "Must I then actually receive these barbarians?" But we had our revenge in a noble way. We took off our boots before we entered the room, were so profuse with talk, civilities, and bows, and on the whole behaved in such a courteous fashion, that our previously distracted host not only bade us welcome back, but also gave us a letter of introduction to the innkeepers at an inn where we were to stay next, declaring that if we showed this letter we need not fear any such disagreeable adventure as that just described.

Most of the houses in the Japanese towns are built of pretty thin, carefully joined timbers. But besides these there are to be seen here and there small houses with very thick walls, windows provided with heavy iron gratings, and doors that could be fastened with large locks and bolts. These houses are fire-resisting, and are used as storehouses for valuables and household articles when there is danger of fire. Fires are so common in Japan that it is supposed that a tenth part of every town is burned down yearly. The fireman corps is numerous, well ordered from old times, its members bold and daring. During our stay overnight at Takasaki we were lodged in such a fire-proof house, in very large clean apartments with the floor partly covered with carpets after the European pattern. The walls were very thick and of brick; the interior fittings and stairs on the other hand of wood.

I have just mentioned that we were compelled to resort to the police in order to obtain quarters for the night. Policemen are numerous in Japan, both in town and country. For the most part they are taken from the former *samurai* class. They are clothed in the European style; and walk, with a long stick in a certain position under the arm, quietly and calmly on the streets and roads, without, except in cases of necessity, making any

show of their authority. Commonly they are, or appear to be, young, and all have a gentlemanlike appearance. In a word, they appear to be equal to the best European police of the present day, and stand immeasurably above the guardian of the peace, or rather the raiser of dispeace, as he appeared some decades ago on the European continent. During the latest revolt the police were employed by the Government as infantry, and elicited general admiration by the fire, the gallantry, and the contempt of death with which they went into action with their old favourite weapon, the Japanese sword.

A passport is still required for travelling in the interior of the country, but this is easily obtained at the request of the consul if health or the wish to prosecute researches be given as the reason, it being possible perhaps to include common love of travelling under the latter head. Commercial travelling is not yet permitted in the interior, nor is the right of settling for the purpose of carrying on business granted to Europeans. The foreign ambassadors have often entered into negotiations in order to bring about a change on this point, but hitherto without success, because the Government, as a condition for the complete opening of the country, require the abrogation of the unreasonable "extra-territorial" arrangement which is in force, and by which the foreigner is not subject to the common laws and courts of Japan, but to the laws of his own country, administered by consular courts. An alteration in this point may however be brought about in a short time, as Japan will soon be sufficiently powerful to be able to abrogate all the injurious paragraphs in her treaties with the civilised countries of Europe. Now, besides, the ambassadors of the foreign powers, who in former times all acted together, have divided into two parties, of which one—Russia and America—wishes, or at least feigns to wish, gradually to free Japan from all tutelage and to place it on an equality with other civilised countries; the other again—England, Germany, Holland, and France—wishes still to retain the guardianship, which

was established by violence, and confirmed by treaty several years ago.

Shortly before our arrival a quarrel took place between Japan and the European powers about, as the Japanese themselves said, a breach of international law, which caused much irritation in the country. A German vessel coming from Nagasaki, where the cholera was raging, on the advice of the German minister broke the quarantine prescribed by the Government, and without further precautions discharged her cargo in the harbour of Yokohama. That the cholera in this town was thereby *made worse* is indeed not only unproved but also undoubtedly incorrect, though many Japanese in their irritation positively affirmed that this was the case; but the words that were uttered by Japan's *féted* guest, ex-President General GRANT,[1] that the Japanese Government had the right without more ado to sink the vessel, have left a memory in the minds both of the Government and of the people, which may in the future lead them to a perhaps unwise but fully justified exertion of their strength were such a deed to be repeated.

The first impression of the Japanese, both men and women, is exceedingly pleasant, but many Europeans who have lived a considerable time in the country say that this impression is not maintained, a circumstance which in my belief depends more on the Europeans themselves than on the Japanese. For the European merchants are said not to find it so easy to cut gold here with a case-knife as before, and the ambassadors of the Great Powers find it day by day more difficult to maintain their old commanding standpoint towards a government which knows that a great future is before the country, if inconsiderate ambition or unlooked-for misfortune do not unexpectedly hinder its development. Another reproach, that the Japanese can imitate what another has done, but is unable himself to invent anything

[1] General Grant, as is well known, visited Japan in the autumn of 1879. He left Yokohama the day after the *Vega* anchored in its harbour.

new, appears on the other hand to be justified in the meantime. But it is unreasonable to demand that a nation should not only in a few decades pass through a development for which centuries have been required in Europe, but also immediately reach the summit of the knowledge of our time so as to be at the same time creative. But it would be wonderful, if the natural science, literature, and art of the nineteenth century, transplanted among a gifted people, with a culture so peculiar and so pervasive, and with an art-sense so developed as those of Japan, did not in time produce new, splendid, and unexpected fruit. The same irresistible necessity which now drives the Japanese to learn all that the European and the American know, will, when he has reached that goal, spur him on to go further up the Nile river of research.

A short distance beyond Takasaki the road to the volcano to which we were on our way, was no longer along Nakasendo, and we could therefore no longer continue our journey in carriages drawn by horses, but were compelled to content ourselves with *jinrikishas*. In these, on the 29th of September, we traversed in five and a half hours the very hilly road to Ikaho, noted for its baths, situated at a height of 700 metres above the sea. The landscape here assumes a quite different stamp. The road which before ran over an unbroken plain, thickly peopled, and cultivated like a garden, now begins to pass between steep uncultivated hills, overgrown with tall, uncut, withered grass, separated by valleys in which run purling rivulets, nearly concealed by exceedingly luxuriant bushy thickets. Ikaho is celebrated for the warm, or more correctly hot, springs which well up from the volcanic hills which surround the little town, which is beautifully situated on a slope. As at the baths of Europe, invalids seek here a remedy for their ailments, and the town therefore consists almost exclusively of hotels, baths, and shops for the visitors. The baths are situated, partly in large open wooden sheds, where men and women bathe together

without distinction, partly in private houses. In every bath there is a basin one metre in depth, to which a constant stream of water is conducted from some of the hot springs. The spring water has of course cooled very much before it is used, but is still so hot notwithstanding that I could only with difficulty remain in it a couple of seconds.

In the streets of the town we often met blind persons who walked about very safely without any attendant, only feeling their way with a long bamboo. They blew a short pipe now and then to warn passers-by of their presence. I thought at first that these unfortunates were trying to regain the sight of the eye at the hot springs, but on inquiring whether the water was beneficial in that respect, I was informed that they were not there as seekers after health, but as "massageurs" (shampooers). Massage has been in use in Japan for several centuries back, and therefore persons are often to be met with in the streets offering their services as massageurs, crying in the streets in about the same way as the fruit-sellers in Russia.

The inn where we lodged for the night, consisted as usual of a number of very clean rooms covered with mats, without furniture, but ornamented with songs and mottoes on the walls. One would live here exceedingly well, if like the Japanese he could manage to live wholly on the floor and conform carefully to the indispensable rules, an observance which besides is necessary, because otherwise the inmate is exposed to a very unfriendly reception not only from his host but also from the attendants. An inconvenience in travelling in Japan is the difficulty a European has in accustoming himself to the dietary of the Japanese. Bread they do not use, nor meat, but their food consists mainly of rice and fish, with fowls, fruit, mushrooms, sweetmeats, Japanese tea, &c., in addition. Fish is generally eaten raw, and in that case is said to differ little in taste from our pickled salmon. The food is not unfrequently cooked with fish oils of anything but an agreeable taste. If a

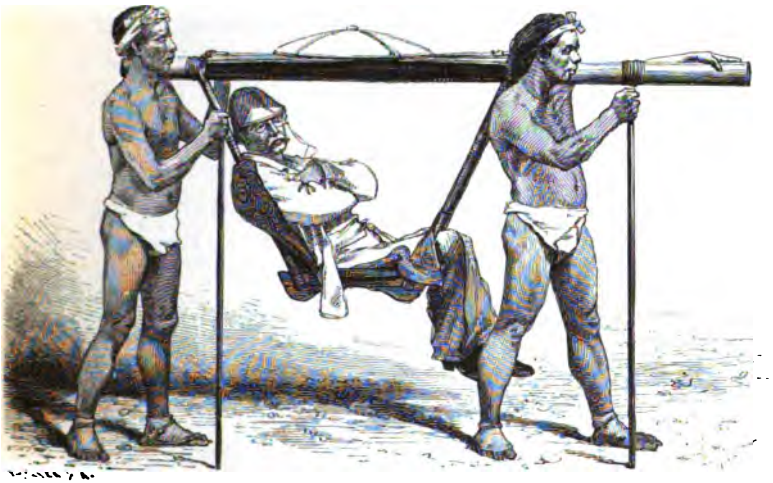
traveller wishes to avoid this dietary, he must have his own cook with him on the journey. In this capacity there attended us a Japanese, whose name was Senkiti-San, but who was commonly called by his companions Kok-San (Mr. Cook). He had learned European (French) cooking at Yokohama, and during the journey devoted himself with so great zeal to his calling, that even in the deserts at the foot of Asamayama he gave himself no rest until he could offer us a dinner of five dishes, consisting of chicken soup, fowl omelette, fowl-beefsteak, fowl *fricassé*, and omelette *aux confitures*, all thus consisting only of fowls and hens' eggs, cooked in different ways.

For some years back lucifer matches have been an article of necessity in Japan, and it was pleasing to us Swedes to observe that the Swedish matches have here a distinct preference over those of other countries. In nearly every little shop, even in the interior of the country, are to be seen the well-known boxes with the inscription "Säkerhets tändstickor utan svafvel och fosfor." But if we examine the boxes more carefully, we find upon many of them, along with the magic sentence unintelligible to the Japanese, an inscription indicating that they have been made by some Japanese manufacturer. On other boxes this is completely wanting, but the falsification is shown by an unfortunate error in the inscription. It thus appears that the Swedish matches are not only introduced into Japan on a large scale, but are also counterfeited, being made with the Swedish inscription on the box and with a cover resembling that used at home. The imitation, however, is not nearly so good as the original, and my Japanese servant bade me therefore, when I purchased a box of matches, observe carefully that I got one of the right (Swedish) sort.

Photography also has spread so rapidly in the country that at many places in small towns and villages in the interior Japanese photographers are to be met with who put out of their hands by no means bad work. The Japanese appear to have a great

liking for having their by no means remarkable dwellings photographed. On several occasions, when we left a place we received from our host as a parting gift a photograph of his house or inn. Perhaps this was done with the same view as that which induces his European brother-in-trade to advertise at great expense.

Between Ikaho and Savavatari, our next resting-place, the road was so bad that the *jinrikisha* could no longer be used, we accordingly had to use the *kago*, a Japanese sedan-chair made of bamboo, of the appearance of which the accompanying wood-



JAPANESE KAGO.

cut gives an idea. It is exceedingly inconvenient for Europeans, because they cannot like the Japanese sit with their legs crosswise under them, and in course of time it becomes tiresome to let them dangle without other support by the side of the *kago*. Even for the bearers this sedan chair strikes me as being of inconvenient construction, which is shown among other things by their halting an instant every two hundred, or in going up a hill, every hundred paces, in order to shift the shoulder under the bamboo pole. We went up-hill and down-hill with considerable

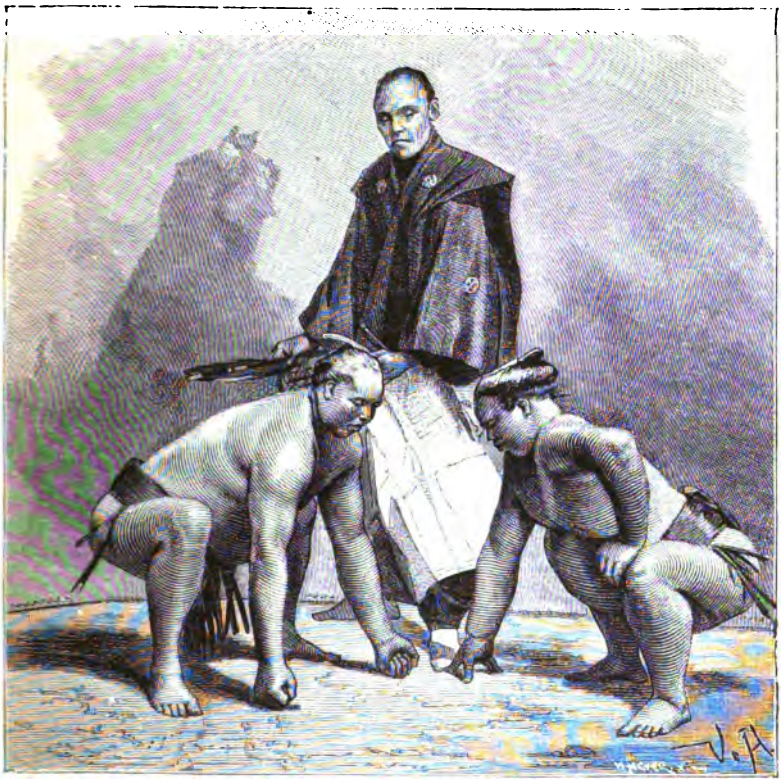
speed however, so that we traversed the road between Ikaho and Savavatari, 6 *ri*. or 23·6 kilometres in length, in ten hours. The road, which was exceedingly beautiful, ran along flowery banks of rivulets, overgrown with luxuriant bamboo thickets, and many different kinds of broad-leaved trees. Only round the old temples, mostly small and inconsiderable, were to be seen ancient tall Cryptomeria and Ginko trees. The burying places were commonly situated, not as at home, in the neighbourhood of the larger temples, but near the villages. They were not inclosed, but marked out by stone monuments from a third of a metre to half a metre in height, on one side of which an image of Buddha was sometimes sculptured. The recent graves were often adorned with flowers, and at some of them small foot-high Shinto shrines had been made of wooden pins.

Savavatari, like Ikaho, is built on the slope of a hill. The streets between the houses are almost all stairs or steep ascents. Here too there well up from the volcanic rocks acidulous springs, at which invalids seek to regain health. The watering-place, however, is of less repute than Ikaho or Kusatsu.

While we walked about the village in the evening we saw at one place a crowd of people. This was occasioned by a competition going on there. Two young men, who wore no other clothes than a narrow girdle going round the waist and between the legs, wrestled within a circle two or three metres across drawn on a sandy area. He was considered the victor who threw the other to the ground or forced him beyond the circle. A special judge decided in doubtful cases. The beginning of the contest was most peculiar, the combatants kneeling in the middle of the circle and sharply eying each other in order to make the attack at a signal given by the judge, when a single push might at once make an end of the contest. In this competition there took part about a dozen young men, all well grown, who in their turn stepped with some encouraging cries or gestures into the circle in order to test their powers.

The spectators consisted of old men and women, and boys and girls of all ages. Most of them were clean and well-dressed, and had a very attractive appearance.

Here it was the youth of the village themselves that took

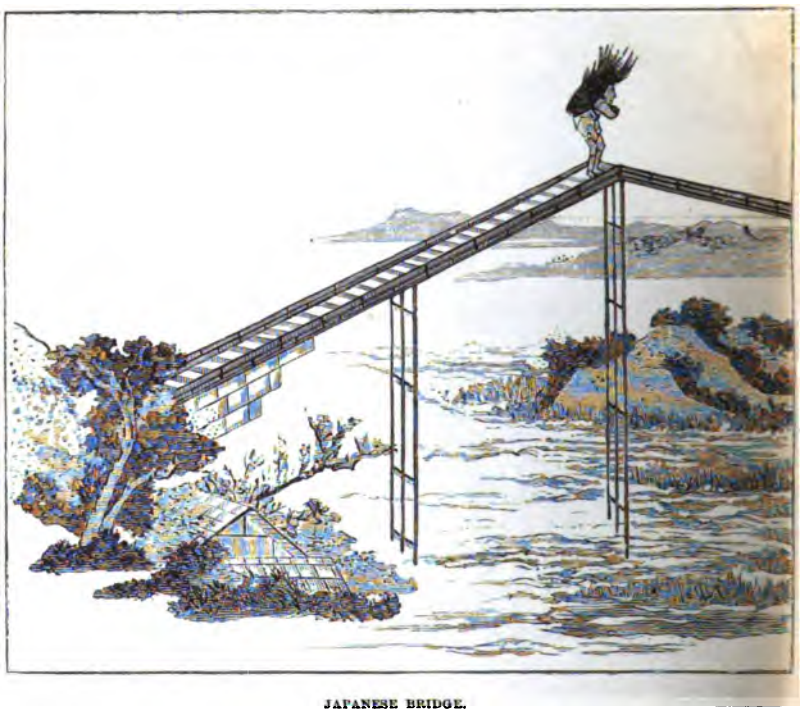


JAPANESE WRESTLERS.

part in the contest. But there are also in Japan persons who carry on these games as their occupation, and exhibit themselves for money. They are in general very fat, as appears from the accompanying drawing, which represents the beginning of the

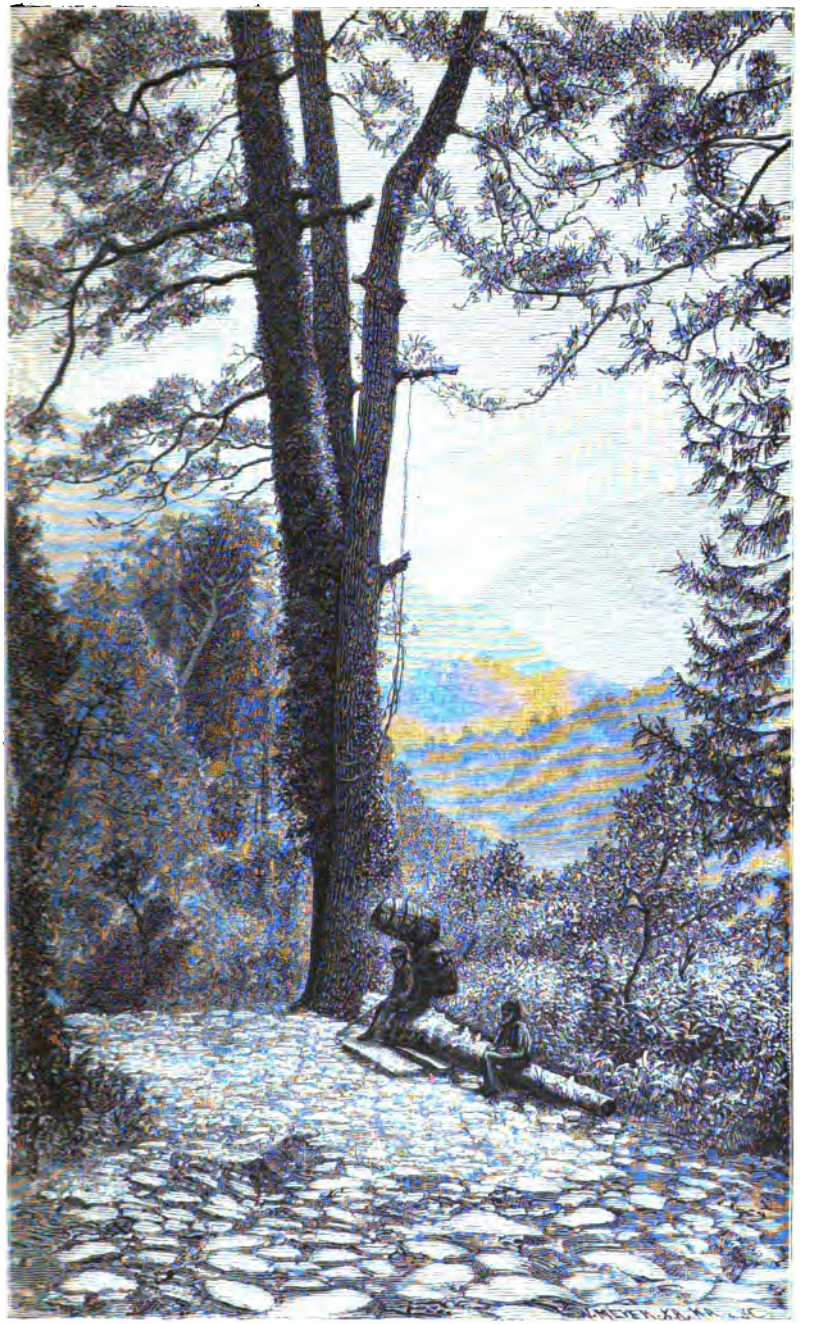
contest, when both the combatants are still watching to get a good hold.

Next day, the 1st October, we continued our journey to Kusatsu. The road was uphill for a distance of 550 metres, downhill for nearly as far, then up again, and ran often without any protecting fence past deep abysses, or over high bridges of



JAPANESE BRIDGE.
After a Japanese drawing.

the most dangerous construction. It was, therefore, impossible for any wheeled vehicle to traverse it, so that we had to use in some cases *kagos*, in others riding-horses. Unfortunately the Japanese high saddle does not suit the European, and if the traveller prefers a riding-horse to a *kago*, he must, if he does not



JAPANESE MOUNTAIN LANDSCAPE.

carry a saddle with him, determine to ride on an unsaddled horse, which, with the wretched steeds that are only available here, soon becomes so unpleasant that he at last prefers to let his legs hang benumbed from the *kago*. A peculiarity in Japan is that the rider seldom himself guides his horse. It is commonly led by a halter by a groom running alongside the rider. These grooms are very light-footed and enduring, so that even at a rapid pace they are not left behind. Running footmen also attend the carriages of people of distinction in the towns and the mail-coaches on Nakasendo. When there is a crowd before the carriage they jump down and drive away the people by a dreadful shouting. From the mail-coach they also blow the post-horn, not just to the advantage of the ear-drums of the travellers.

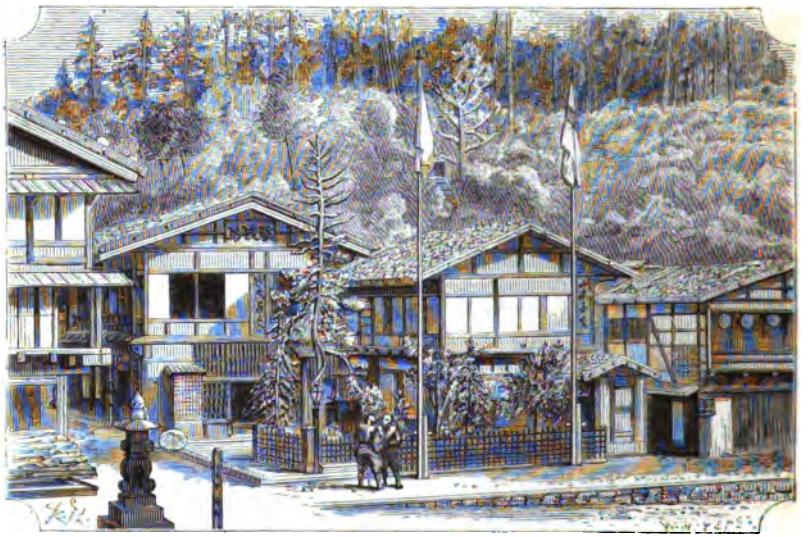
The scenery by the roadside was exceedingly beautiful. Now it consisted of wild valleys, filled with luxuriant vegetation which completely concealed the crystal-clear streams purling in the bottoms; now of level grassy plains or hill-slopes, thickly studded with solitary trees, chiefly chestnuts and oaks. The inhabitants were fully occupied with the chestnut harvest. Before every hut mats were spread out, on which chestnuts lay drying in thick layers. Grain and cotton were being dried in the same small way, as it appeared to us Europeans. On the plains there stood besides in the neighbourhood of the cabins large mortars, by which the grain was reduced to groats. On the hills these tramp-stamps are partly replaced by small mills of an exceedingly simple construction, introduced by the Dutch.

We passed the 2nd October at Kusatsu, the Aix-la-Chapelle of Japan, famed like that place for its hot sulphurous springs. Innumerable invalids here seek an alleviation of their pains. The town lives upon them, and accordingly consists mainly of baths, inns, and shops for the visitors.

The inns are of the sort common in Japan, spacious, airy clean, without furniture, but with good braziers, miniature

tea-services, clean matting, screens ornamented with poetical mottoes, which even when translated were almost unintelligible to us, friendly hosts, and numerous female attendants. If the traveller brings his own cook with him, as we did, he can live very comfortably, as I have before stated, at such an inn.

The hot springs which have conferred on Kusatsu its importance rise at the foot of a pretty high hill of volcanic origin. The rocks in the surrounding country consist exclusively of lava



INN AT KUSATSU.

and volcanic tuffs, and a short distance from the town there is an extinct volcano in whose crater there are layers of sulphur.[1] In the immediate neighbourhood of the place where the main spring rises there is a thick solidified lava stream, surrounded by tuffs, which near the surface is cleft into a number of large vesicular blocks. From this point the hot water is conducted

[1] According to the statement of the inhabitants; I had not time to visit the place.

in long open wooden channels to the bath-house of the town, and to several evaporating pools, some by the wayside, others in the town, intended for collecting the solid constituents of the water, which are then sold in the country as medicine. The great evaporation from these pools, from the open channels and the hot baths, wraps the town almost constantly in a cloud of watery vapour, while a very strong odour of sulphuretted hydrogen reminds us that this is one of the constituents of the healing waters.

The road between the wells and the town appears to form the principal promenade of the place. Along this are to be seen innumerable small monuments, from a half to a whole metre in height, consisting of pieces of lava heaped upon each other. These miniature memorials form by their littleness a peculiar contrast to the *bauta* stones and *jettekast* of our Swedish forefathers, and are one of the many instances of the people's fondness for the little and the neat, which are often to be met in Japan. They are said to be erected by visitors as thank-offerings to some of the deities of Buddha or Shinto.

I received from a Japanese physician the following information regarding the wells at Kusatsu and their healing power. In and near the town there are twenty-two wells, with water of about the same quality, but of different uses in the healing of various diseases. In the hottest well the water where it rises has a temperature of 162° F. (= 72·2° C.). The largest number of the sick who seek health at the baths, suffer from syphilis. This disease is now cured according to the European method, with mercury, iodide of potassium, and baths. The cure requires a hundred days; from seventy to eighty per cent. of the patients are cured completely, though purple spots remain on the skin. The disease does not break out anew. A large number of leprous patients also visit the baths. The leprosy is of various kinds; that with sores is alleviated by the baths, and is cured possibly in two years; that without sores but with the skin

insensible is incurable, but is also checked by frequent bathing. All true lepers come from the coast provinces. A similar disease is produced also among the hills by the eating of tainted fish and fowl. This disease consists in the skin becoming insensible, the nerves inactive, and the patient, who otherwise feels well, finding it impossible to walk. It is also cured completely in very severe cases, by baths, ammonia applied inwardly, castor-oil, Peruvian bark, &c. A third type of this ailment is the bone-disease, *kak'ke'*, which is exceedingly common in Japan, and is believed to be caused by unvarying food and want of exercise. It is very obstinate, but is often cured in two or three years with chloride of iron, albumen, change of diet from the common Japanese to the European, with red wine, milk, bread, vegetables, &c. This disease begins with a swelling in the legs, then the skin becomes insensible, first on the legs, next on the stomach, the face, and the wrists. Then the swelling falls, fever comes on, and death takes place. There are besides, certain wells for curing rheumatism, for which from two to three years are required; for eye-diseases and for headache, the latter playing an important part among the illnesses that are cured at Kusatsu. It principally attacks women between twenty and thirty years of age. One of the Kusatsu wells acts very beneficially in this case. Its water is conducted to a special bathing-shed open to the street, intended exclusively for the men and women who suffer from this disease.

Many of the baths at Kusatsu are taken so hot that special precautions must be adopted before one steps down into the water. These consist in winding cotton cloths round those parts of the body which are most sensitive, and in causing the body to perspire strongly before the bath is taken, which is done by the bathers with cries and shouts and with certain movements stirring the water in the basin with large heavy boards. They then all step down into the bath and up again simultaneously at a sign given by the physician sitting at the back of the bathing

shed. Without this arrangement it would perhaps be difficult to get the patients to go into the bath, for agreeable it could not be, to judge from the grave faces of the bathers and the fire-red colour of their bodies when they come out.

The baths are under open sheds. Men and women all bathe in common, and in presence of both male and female spectators. They make their remarks without reserve on the diseases of the patients, even if they are of that sort about which one would

BATH AT KUSATSU.

not speak willingly even to his physician. Often the bath-basin is not fenced off in any way, except that it is protected from rain and sunshine by a roof resting on four posts. In such cases the bathers dress and undress in the street.

In consequence of the situation of Kusatsu at a height of 1050 metres above the sea, the winter there is very cold and windy. The town is then abandoned not only by the visitors to

the baths, but also by most of the other inhabitants. Already, at the time of our visit, the number of bathers remaining was only inconsiderable. Even these were preparing to depart. During the second night that we passed at Kusatsu, our night's rest was disturbed by a loud noise from the next room. It was a visitor who was to leave the place the following morning, and who now celebrated his recovery with *saki* (rice-brandy) and string music.

The environs of Kusatsu are nearly uncultivated, though the vegetation is exceedingly luxuriant. It consists partly of bamboo thickets, partly of a high rich grass, above which rise solitary pines, mixed with a few oaks or chestnuts.

On the 3rd October we continued our journey to the foot of Asamayama. The road was very bad, so that even the *kago* bearers had difficulty in getting along. It first ran across two valleys more than 300 feet deep, occupied with close, luxuriant, bushy thickets. We then came to an elevated plain of great extent covered with unmown grass, studded with beautiful oaks and chestnuts. The plain was not turned to any account, though thousands of the industrious population could find an abundant living there by tending cattle. Farther up the oaks and chestnuts were mixed with a few birches, resembling those at home, and we came next to complete deserts, where the ground consisted of lava blocks and lava gravel, scarcely covered by any grass, and yielding nourishment only to solitary pines. This continued to the place—Rokuriga-hara—where we were to pass the night, and from which the next day we were to ascend the summit of Asamayama.

Rokuriga-hara is situated at a height of 1270 metres above the sea. There was no inn here, nor any place inhabited all the year round, but only a large open shed. This was divided into two by a passage in the middle. We settled on one side of this, making our bed as well as we could on the raised floor, and protecting ourselves from the night air with coverings which our

thoughtful host at Kusatsu had lent us. On the other side of the passage our *kago* bearers and guide passed the night crowding round a log fire made on a stone foundation in the middle of the floor. The *kago* bearers were protected from the very perceptible night cold only by thin cotton blouses. In order to warm them I ordered an abundant distribution of *saki*, a piece of generosity that did not cost very much, but which clearly won me the undivided admiration of all the coolies. They passed the greater part of the night without sleep, with song and jest, with their *saki* bottles and tobacco pipes. We slept well and warmly after partaking of an abundant supper of fowl and eggs, cooked in different ways by Kok-San with his usual talent and his usual variety of dishes.

We had been informed that at this place we would hear a constant noise from the neighbouring volcano, and that hurtful gases (probably carbonic acid) sometimes accumulated in such quantities in the neighbouring woods that men and horses would be suffocated if they spent the night there. We listened in vain for the noise, and did not observe any trace of such gases. All was as peaceful as if the glowing hearth in the interior of the earth was hundreds of miles away. But we did not require the evidence of the column of smoke which was seen to rise from the mountain top, which formed the goal of our visit, or of the inhabitants who survived the latest eruption, to come to the conclusion that we were in the neighbourhood of an enormous, still active volcano. Everywhere round our resting-place lay heaps of small pieces of lava which had been thrown out of the volcano (so-called lapilli), and which had not yet had time to weather sufficiently to serve as an under-stratum for any vegetation, and a little from the hut there was a solidified lava stream of great depth.

Next day, the 4th October, we ascended the summit of the mountain. At first we travelled in *kago* over a valley filled with pretty close wood, then the journey was continued on foot

up the steep volcanic cone, covered with small lava blocks and lapilli. The way was staked out with small heaps of stones raised at a distance of about 100 metres apart. Near the crater we found at one of these cairns a little Shinto shrine, built of sticks. Its sides were only half a metre in length. Our guide performed his devotions here. One of them had already at a stone cairn situated farther down with great seriousness made some conjurations with reference to my promise to make an extra distribution of red wine, if we got good weather at the top.

As on Vesuvius, we can also on Asamayama distinguish a large exterior crater, originating from some old eruption, but now almost completely filled up by a new volcanic cone, at whose top the present crater opens. This crater has a circumference of about two kilometres; the old crater, or what the old geologists called the elevation-crater, has been much larger. The volcano is still active. For it constantly throws out "smoke," consisting of watery vapour, sulphurous acid, and probably also carbonic acid. Occasionally a perceptible smell of sulphuretted hydrogen is observed. It is possible without difficulty to crawl to the edge of the crater and glance down into its interior. It is very deep. The walls are perpendicular, and at the bottom of the abyss there are to be seen several clefts from which vapours arise. In the same way "smoke" forces its way at some places at the edge of the crater through small imperceptible cracks in the mountain. Both on the border of the crater, on its sides and its bottom there is to be seen a yellow efflorescence, which at the places which I got at to examine it consisted of sulphur. The edge of the crater is solid rock, a little-weathered augiteandesite differing very much in its nature at different places. The same or similar rocks also project at several places at the old border of the crater, but the whole surface of the volcanic cone besides consists of small loose pieces of lava, without any trace of vegetation. Only at one place the brim of the old crater is covered with an open pine

wood. The volcano has also small side craters, from which gases escape. The same coarse fantasy, which still prevails in the form of the hell-dogma among several of the world's most cultured peoples, has placed the home of those of the followers of Buddha who are doomed to eternal punishment in the glowing hearths in the interior of the mountain, to which these crater-openings lead; and that the heresies of the well-meaning Bishop Lindblom have not become generally prevalent in Japan is shown among other things by this, that many of these openings are said to be entrances to the "children's hell." Neither at the main crater nor at any of the side craters can any true lava streams be seen. Evidently the only things thrown out from them have been gases, volcanic ashes, and lapilli. On the other hand, extensive eruptions of lava have taken place at several points on the side of the mountain, though these places are now covered with volcanic ashes.

After having eaten our breakfast in a cleft so close to the smoking crater that the empty bottles could be thrown directly into the bottomless deeps, we commenced our return journey. At first we took the same way as during the ascent, but afterwards held off to the right, down a much steeper and more difficult path than we had traversed before. The mountain side had here a slope of nearly forty-five degrees, and consisted of a quite loose volcanic sand, not bound together by any vegetable carpet. It would therefore have been scarcely possible to ascend to the summit of the mountain this way, but we went rapidly downwards, often at a dizzy speed, but without other inconvenience than that one now and then fell flat and rolled headforemost down the steep slopes, and that our shoes were completely torn to tatters by the angular lava gravel. Above the mountain-top the sky was clear of clouds, but between it and the surface of the earth there spread out a thick layer of cloud which seen from above resembled a boundless storm-tossed sea, full of foaming breakers. The extensive view we would otherwise have

had of the neighbouring mountain ridges from the top of Asamayama was thus concealed. Only here and there an opening was formed in the cloud, resembling a sun-spot, through which we got a glimpse of the underlying landscape. When we came to the foot of the mountain we long followed a ridge, covered with greenery, formed of an immense stream of lava, which had issued from an opening in the mountain side now refilled. This had probably taken place during the tremendous eruption of 1783, when not only enormous lava-streams destroyed forests and villages at the foot of the mountain, but the whole of the neighbouring region between Oiwake and Usui-toge, previously fertile, was changed by an ash-rain into an extensive waste. Across this large plain, infertile and little cultivated, situated at a height of 980 metres above the sea, we went without a guide to the village Oiwake, where we lodged for the night at an inn by the side of the road Nakasendo, one of the cleanest and best kept of the many well-kept inns I saw during our journey in the interior of the country.

Hence I sent a messenger on foot to Takasaki to order a carriage to Tokio. A former *samurai* undertook for a payment of three *yen* (about 12*s.*) to carry the message. Oiwake is indeed situated on the great road Nakasendo, but it can here only with difficulty be traversed by carriages, because between this village and Takasaki it is necessary to go over the pass Usui-toge, where the road, though lowered considerably of late, rises to a height of 1200 metres. We therefore here used *jinrikishas*, a mode of conveyance very agreeable to tourists, which, though introduced only recently, has already spread to all parts of the country.

Every one with an open eye for the beauties of nature and interest in the life and manners of a foreign people, must find a journey in a *jinrikisha* over Usui-toge pleasant in a high degree. The landscape here is extraordinarily beautiful, perhaps unmatched in the whole world. The road has been made here

JAPANESE LANDSCAPE.

with great difficulty between wild, black, rocky masses, along deep clefts, whose sides are often covered with the most luxuriant vegetation. No fence protects the *jinrikisha* in its rapid progress down the mountains from the bottomless abysses by the wayside. A man must therefore not be weak in the nerves if he is to derive pleasure from the journey. He must rely on the coolie's keen eye and sure foot. On all sides one is surrounded by a confused mass of lofty shattered mountain tops, and deep down in the valleys mountain streams rush along, whose crystal-clear water is collected here and there into small lakes confined between heights covered with greenery. Now the traveller passes a dizzy abyss by a bridge of the most defective construction, now he sees a stream of water rushing down from an enormous height by the wayside. Thousands of foot-passengers, crowds of pilgrims, long rows of coolies, oxen and horses bearing heavy burdens meet the traveller, who during frequent rests at the foot of the steep slopes has an opportunity of studying the variegated life of the people. He is always surrounded by cheerful and friendly faces, and the pleasant impression is never disturbed by the expressions of coarseness in speech and behaviour which so often meet us in Europe.

It is not until the traveller has passed the mountain ridge and descended to a height of only 300 metres above the sea that the road becomes passable for a carriage. While we exchanged, not without regret, our clean, elegant *jinrikishas* for two inferior vehicles drawn by horses, I saw two men wandering from shop to shop, standing some moments at each place, ringing a bell and passing on when they were not attended to. On my inquiry as to what sort of people they were, I was informed that they were wandering players. For me of course they did not ring in vain. For a payment of fifty cents they were ready immediately to show in the street itself a specimen of their art. One of them put on a well-made mask, representing the head of a monster, with a movable jaw and terrible teeth. To the

mask was fastened a cloak, in which the player wrapt himself during the representation. He then with great skill and supple tasteful gestures, which would have honoured a European *danseuse*, represented the monster now creeping forward fawningly, now rushing along to devour its prey. A numerous crowd of children collected around us. The small folks followed the representation with great glee, and gave life to the play, or

BURDEN-BEARERS ON A JAPANESE ROAD.
Japanese drawing.

rather formed its proper background, by the feigned terror with which they fled when the monster approached with open mouth and rolling eyes, and the eagerness with which they again followed and mocked it when its back was turned.

In few countries are dramatic representations of all kinds so much thought of as in Japan. Playhouses are found even in small towns. The play is much frequented, and though the

representations last the whole day, they are followed by the spectators with the liveliest interest. There are playbills as at home, and numerous writings on subjects relating to the theatre. Among the Japanese books which I bought, there was for instance a thick one, with innumerable woodcuts, devoted to showing how the first Japanese artists conceived the principal scenes in their *rôles*, two volumes of playbills bound up together, &c.

The Japanese pieces indeed strike a European as childish and monstrous, but one must admire many praiseworthy traits in the play itself, for instance the naturalness with which the players often declaim monologues lasting for a quarter or half an hour. The extravagances which here shock us are perhaps on the whole not more absurd than the scenes of the opera of to-day, or the buskins, masks, and peculiar dresses, which the Greeks considered indispensable in the exhibition of their great dramatic masterpieces. When the Japanese have been able to appropriate what is good in European culture, the dramatic art ought to have a grand future before it among them, if the development now going on is carried out cautiously so that the peculiarities of the people are not too much effaced. For, in many departments, and not least in that of art, there is much to be found here which when properly developed will form a new and important addition to the culture of the West, of which we are so proud.

The large Japanese theatres, besides, often resemble the European ones in their interior arrangement. The partition between the stage and the space occupied by the spectators is the same as among us. Between the acts the former is concealed by a curtain. The stage is besides provided with painted scenes representing houses, woods, hills, &c., supported on wheels, so that a complete change of scene can be effected in a few moments. The music has the same place between the stage and the spectators as at home. The latter, as at home, are

distributed partly in a gently rising amphitheatre, partly in several tiers of boxes rising one above another, the lowest tier being considered the principal one. The Japanese do not sit in the same way as we do. Neither the amphitheatre nor the boxes accordingly are provided with chairs or benches, but are divided into square compartments one or two feet deep, each intended for about four persons. They sit on cushions, squatting cross-legged in the common Japanese fashion. The compartments are divided by broad cross beams, which form the passages by which the spectators get to their places. During the play we saw attendants running about with tea, *saki*, tobacco pipes, and small braziers. For every one smokes during the acts, and places himself in his crib as comfortably as possible. The piece is followed with great attention, favourite actors and favourite passages being saluted with lively applause. Even women and children visit the theatre, and I have seen the former give their children suck without the least discomposure among thousands of spectators. Besides the plays intended for the public, there are given also a number of other dramatic representations, as society plays, peculiar family plays intended for the homes of the old feudal princes, spectacles got up for the Mikado, and some which have a half religious significance, &c.

On the evening of the 5th October we came to Takasaki, prepared to start immediately for Tokio. But though the messenger we sent had duly executed his commission, horses could not be procured before midnight. We passed the evening with our former host, who at our first visit received us so unwillingly, but now with great friendliness. We would easily have reconciled ourselves to the delay, for a Japanese small town such as Takasaki has much worth seeing to offer a European, but a great part of the time was wasted in fruitless attempts to get the horse-hirer to let us have the horses a few hours earlier. In spending time in long conversations mixed with civilities and bows the Japanese are masters. Of

this bad habit, which still often makes the European desperate, it will not perhaps be long necessary to complain, for everything indicates that the Japanese too will soon be carried along at the endlessly roaring speed of the Steam Age.

When we had at last got horses we continued our journey, first in a carriage to Tokio, then by rail to Yokohama, arriving there on the afternoon of the 6th October. From this journey I shall only relate an incident which may form a little picture throwing light on life in Japan.

While we halted for a short time in the morning of the 6th October at a large inn by the roadside, we saw half a dozen young girls finishing their toilets in the inn-yard. In passing we may say, that a Japanese peasant girl, like girls in general, may be pretty or the reverse, but that she generally is, what cannot always be said of the peasant girls at home, cleanly and of attractive manners. They washed themselves at the stream of water in the inn-yard, smoothed their artistically dressed hair, which, however, had been but little disturbed by the cushions on which they had slept, and brushed their dazzlingly white teeth. Soap is not used for washing, but a cotton bag filled with bran. The teeth were brushed with a wooden pin, one end of which was changed by beating into a brush-like collection of wooden cords. The tooth-powder consisted of finely powdered shells and corals, and was kept in small, neat wooden boxes, which, along with tooth-brushes and small square bundles of a very strong and cheap paper, all clearly intended for the use of the peasants, were sold for a trifle in most of the innumerable shops along the road. For such stupid regulations as in former times in Europe rendered traffic in the country difficult, and often obliged the countryman to betake himself to the nearest town to buy some horse-shoes or a roll of wire, appear not to be found in Japan, on which account most of the peasants living on a country road seek a subsidiary way of making a living by trafficking in small articles in request among the country people.

Incidents of the sort referred to we had seen so many times before that on this occasion it would not have attracted any further attention on our part, if we had not thereby been reminded that we must look after our own exterior, before we could make our entrance into the capital of Japan. We therefore took from the carriage our basket with linen, shaving implements, and towels, settled down around the stream of water at which the girls stood, and immediately began to wash and shave ourselves. There was now general excitement. The girls ceased to go on with their own toilet, and crowded round us in a ring in order to see how Europeans behave in such cases, and to give us the assistance that might be required. Some ran laughing and bustling about, one on the top of another, in order immediately to procure us what we wanted, one held the mirror, another the shaving-brush, a third the soap, &c. Round them gathered other elder women, whose blackened teeth indicated that they were married. A little farther off stood men of all ages. Chance had here quite unexpectedly shown us a picture from folk-life of the most agreeable kind. This pleasant temper continued while we immediately after, in the presence of all, ate our breakfast in the porch of the ground-floor, surrounded by our former ministering spirits, now kneeling around us, continually bowing the head to the ground, laughing and chattering. The same fun went on when a little after I bought some living fresh-water fishes and put them in spirit, yet with the difference that the girls now, with some cries, to show their fear of handling the living animals—though fish-cleaning was one of their ordinary occupations—handed over to the men the trouble of taking the fishes and putting them into the spirit-jars. For a worm placed in spirit they feigned the greatest terror, notwithstanding its covering of spirit and glass, and ran shrieking away when any one suddenly brought the jar with the worm near their faces. It ought to be noted to the honour of the Japanese, that although we were by no

means surrounded by any select circle, there was not heard during the whole time a single offensive word among the closely-packed spectators, a fact which gives us an idea of the excellent tone of society which prevails here, even among the lowest of the population, and which shows that the Japanese, although they have much to learn from the Europeans, ought not to imitate them in all. In Japan there is much that is good, old, and national to take note of, perhaps more than the Japanese at present have any idea of, and undoubtedly more than many of the European residents will allow.

CHAPTER XVIII.

Farewell dinner at Yokohama—The Chinese in Japan—Voyage to Kobe—Purchase of Japanese Books—Journey by rail to Kioto—Biwa Lake and the Legend of its Origin—Dredging there—Japanese Dancing-Girls—Kioto—The Imperial Palace—Temples—Swords and Sword-bearers—Shintoism and Buddhism—The Porcelain Manufacture—Japanese Poetry—Feast in a Buddhist Temple—Sailing across the Inland Sea of Japan—Landing at Hirosami and Shimonoseki—Nagasaki—Excursion to Mogi—Collection of Fossil Plants—Departure from Japan.

THE last days at Yokohama were taken up with farewell visits there and at Tokio. An afternoon's leisure during the last day I spent in the capital of Japan I employed in making an excursion in order to dredge from a Japanese boat in the river debouching at the town. The Japanese boats differ from the European in being propelled not by rowing but by sculling. They have usually a deck above the level of the water, which is dazzlingly white and laid with matting, like the rooms in a Japanese house. The dredging yielded a great number of Anodonta, large Paludina, and some small shells.

During our stay in Japan I requested Lieutenant Nordquist to make as complete a collection of the land and fresh-water crustacea of the country as the short time permitted. In consequence of the unusual poverty of the country in these animal forms the result was much smaller than we had hoped. During a preceding voyage to the Polar Sea I had assisted in making

a collection of land crustacea on Renœ, an island north of the limit of trees in the outer archipelago of northern Norway. It is possible to collect there in a few hours as many animals of this group as in fertile Japan in as many days. There are parts of Japan, covered with thick woods and thickets of bushes, where during a forenoon's excursion one can scarcely find a single crustacean, although the ground is full of deep, shady clefts in which masses of dried leaves are collected, and which therefore ought to be an exceedingly suitable haunt for land mollusca. The reason of this poverty ought perhaps to be sought in the want of chalk or basic calcareous rocks, which prevails in the parts of Japan which we visited.

After the Swedish-Dutch minister had further given us a splendid farewell dinner at the Grand Hotel, to which, as before, the Japanese ministers and the representatives of the foreign powers in Japan were invited, we at last weighed anchor on the 11th October to prosecute our voyage. At this dinner we saw for the first time the Chinese embassy which at the time visited Japan with the view of settling the troublesome Loo-Choo affair which threatened to lead to a war between the two great powers of Eastern Asia. The Chinese ambassadors were, as usual, two in number, being commissioned to watch one over the other. One of them laughed immoderately at all that was said during dinner, although he did not understand a word. According to what I was told by one who had much experience in the customs of the heavenly empire, he did this, not because he heard or understood anything worth laughing at, but because he considered it good manners to laugh.

Remarkable was the interest which the Chinese labourers settled at Yokohama took in our voyage, about which they appeared to have read something in their own or in the Japanese newspapers. When I sent one of the sailors ashore to execute a commission, and asked him how he could do that without any knowledge of the language, he replied, "There is no

fear, I always meet with some Chinaman who speaks English and helps me." The Chinese not only always assisted our sailors as interpreters without remuneration, but accompanied them for hours, gave them good advice in making purchases, and expressed their sympathy with all that they must have suffered during our wintering in the high north. They were always cleanly, tall, and stately in their figures, and corresponded in no particular to the calumnious descriptions we so often read of this people in European and American writings.

From Yokohama the course was shaped for Kobe, one of the more considerable Japanese ports which have been opened to Europeans. Kobe is specially remarkable on account of its having railway communication with Osaka, the most important manufacturing town of Japan, and with Kioto, the ancient capital and seat of the Mikado's court for centuries.

I had already begun at Yokohama to buy Japanese books, particularly such as were printed before the opening of the ports to Europeans. In order to carry on this traffic with greater success, I had procured the assistance of a young Japanese very familiar with French, Mr. OKUSCHI, assistant in Dr. Geertz' chemico-technical laboratory at Yokohama. But because the supply of old books in this town, which a few years ago had been of little importance, was very limited, I had at first, in order to make purchases on a larger scale, repeatedly sent Mr. Okuschi to Tokio, the seat of the former Shogun dynasty, and from that town, before the departure of the *Vega* from Yokohama, to Kioto, the former seat of learning in Japan. The object of the *Vega's* call at the port of Kobe was to fetch the considerable purchases made there by Mr. Okuschi.[1]

[1] The number of the works which the collection of Japanese books contains is somewhat over a thousand. The number of volumes amounts to five or six thousand; most of the volumes, however, are not larger than one of our books of a hundred pages. So far as can be judged by the Japanese titles, which are often little distinctive, the works may be

Kobe, or Hiogo, as the old Japanese part of the town is called, is a city of about 40,000 inhabitants, beautifully situated at the entrance to the Inland Sea of Japan, *i.e.*, the sound which separates the main island from the south islands, Shikoku and Kiushiu. Mountain ridges of considerable height here run along the sea-shore. Some of the houses of the European merchants are built on the lower slopes of these hills, with high, beautiful, forest-clad heights as a background, and a splendid view of the harbour in front. The Japanese part of the town consists, as usual, of small houses which, on the side next the street, are occupied mainly with sale or work-shops where the

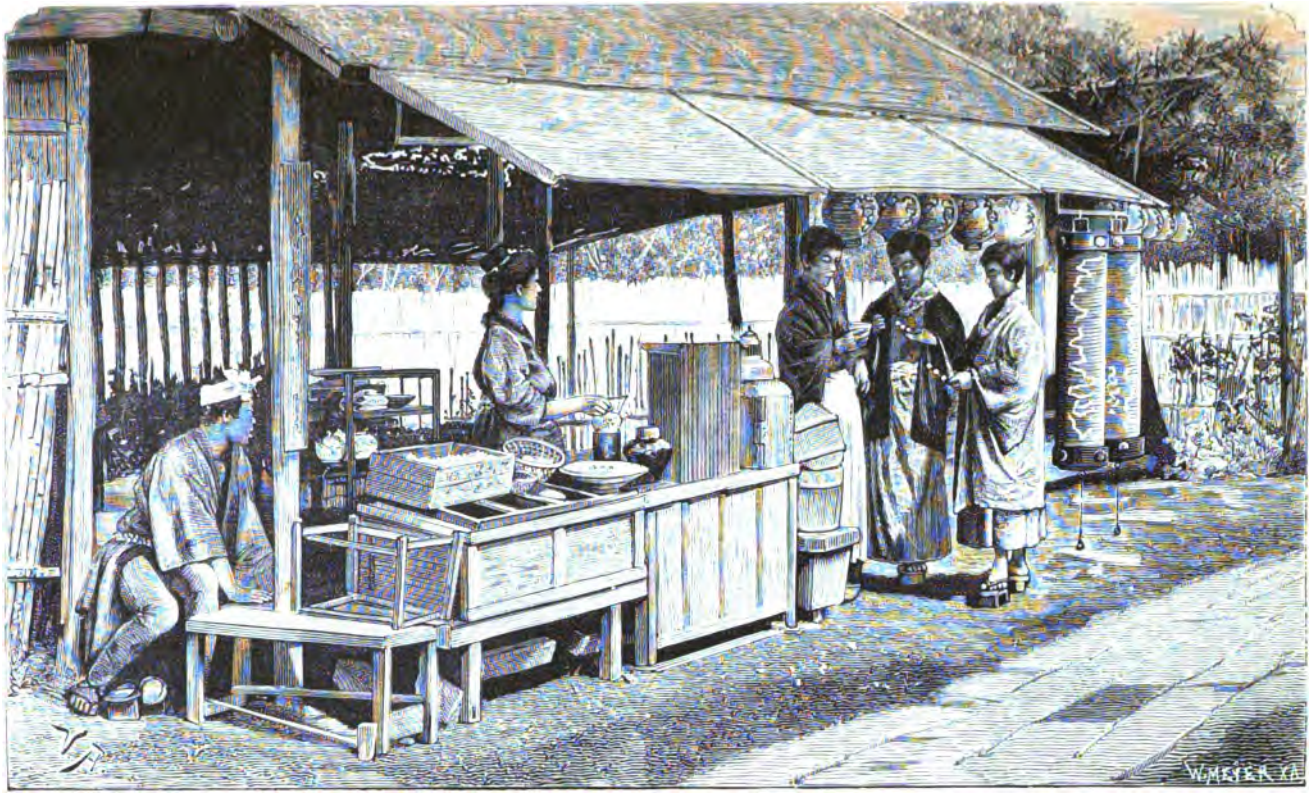
distributed among the various branches of knowledge in the following way:

	Number of Works.
History	176
On Buddhism and Education	161
On Shintoism	38
On Christianity (printed in 1715)	1
Manners and Customs	33
The Drama	13
Laws	5
Politics, Political argumentative writings, partly new and privately printed against the recent statues	24
Poetry and Prose fiction	137
Heraldry, Antiquities, Ceremonies	27
The Art of War and the Use of Weapons	41
Chess	1
Coining	4
Dictionaries, Grammars	18
Geography, Maps	76
Natural History	68
The Science of Medicine	13
Arithmetic, Astronomy, Astrology	39
Handicrafts, Agriculture	43
Notebooks	73
The art of making bouquets (Horticulture ?)	16
Bibliography	9
Various	20
Total	1036

whole family lives all day. The streets have thus a very lively appearance, and offer the foreigner an endless variety of remarkable and instructive pictures from the life of the people. The European part of the town, on the other hand, is built with stately houses, some of which are situated on the street that runs along the shore. Here, among others, are to be found splendid European hotels, European clubs, counting-houses, shops, &c.

Not far from Kobe, and having railway communication with it, is Osaka, the largest manufacturing town of Japan, famed for its theatres and its dancing-girls. Unfortunately I had not time to visit it, for I started for the old capital, Kioto, a few hours after the *Vega* anchored, and after I had waited on the governor in order to procure the passport that is still required for travelling in the interior. He received me, thanks to a letter of introduction I had with me from one of the ministers at Tokio, in an exceedingly agreeable way. His reception-room was part of a large European stone house, the vestibule of which was tastefully fitted up in European style with a Brussels carpet gay with variegated colours. At our visit we were offered Japanese tea, as is customary everywhere in Japan, both in the palace of the Emperor and the cabin of the poor peasant. The Governor was, as all the higher officials in Japan now are, dressed like a European of distinction, but he could not speak any European language. He showed himself, however, to be much interested in our voyage, and immediately ordered an official in his court, who was well acquainted with English, Mr. YANIMOTO, to accompany me to Kioto.

We travelled thither by a railway constructed wholly in the European style. At Kioto my companion, at my special request, conducted me, not to the European hotel there, but to a Japanese inn, remarkable as usual for cleanliness, for a numerous crowd of talkative female attendants, and for the extreme friendliness of the inn people to their guests as soon as they indicated, by taking off their boots at the door, that it



JAPANESE SHOP.

was their intention not to break Japanese customs and usages in any offensive way. A calling card and a letter from Admiral Kawamura, minister of marine, which I sent from the hotel to the Governor of Kioto, procured me an adjutant No. 2, a young, cheerful, and talkative official, Mr. KOBA-YASCHI, whose eyes sparkled with intelligence and merry good humour. One would sooner have taken him for a highly-esteemed student president at some northern university, than for a Japanese official. It was already late in the day, so that before nightfall I had time only to take the bath which, at every Japanese inn not of too inferior a kind, is always at the traveller's call, and arrange the dredging excursion which, along with Lieut. Nordquist, I intended to make next day on Lake Biwa.

The road between Kioto and Biwa we travelled the following morning in *jinrikishas*. In a short time there will be communication between these two places by a railway constructed exclusively by native workmen and native engineers. It will be, and is intended to be, an actual Japanese railway. For a considerable distance it passes through a tunnel, which, however, as some of the Europeans at Kobe stated, might easily have been avoided "if the Japanese had not considered it desirable that Japan, too, should have a railway tunnel to show, as such are found both in Europe and America." It is probable, in any case, that the bends which would have been required if the tunnel was to be avoided, would have cost more by the additional length than the tunnel, and that therefore the procedure of the Japanese was better considered than their envious European neighbours would allow. There appears to prevail among the European residents in Japan a certain jealousy of the facility with which this country, till recently so far behind in an industrial respect, assimilates the skill in art and industry of the Europeans, and of the rapidity with which the people thereby make themselves independent of the wares of the foreign merchants.

When we reached Lake Biwa we were conducted by Mr. Koba-Yaschi to an inn close by the shore, with a splendid view of the southern part of the lake. We were shown into beautiful Japanese rooms, which had evidently been arranged for the reception of Europeans, and in which accordingly some tables and chairs had been placed. On the tables we found, on our arrival, bowls with fruit and confections, Japanese tea, and braziers. The walls were formed partly of tastefully gilt paper panels ornamented with mottoes, reminding visitors of the splendid view.

A whole day of the short time which was allowed me to study the remarkable things of Kioto I devoted to Lake Biwa, because lakes are exceedingly uncommon in the south, for they occur only in the countries which have either been covered with glaciers in the most recent geological periods, or, in consequence of the action of volcanic forces, have been the scene of violent disturbances of the surface of the earth. I believed that Lake Biwa would form an exception to this, but I was probably mistaken; for tradition relates that this lake was formed in a single night at the same time that the high volcanic cone of Fusiyama was elevated. This tradition, in its general outline, corresponds so closely with the teaching of geology, that scarcely any geologist will doubt its truth.

After our arrival at the inn we had to wait a very long time for the steamer I had ordered. On this account I thoughtlessly enough broke out in reproaches on my excellent Japanese adjutants, who, however, received my hard words only with friendly smiles, which increased still further my impatience at the loss of time which was thus occasioned. It was not until far on in the day, when I was already out dredging from a small steamer, that I was informed as to the cause of the delay. The Biwa Steamship Company had, at the request of the Governor, intended to place at my disposal a very large boat well provided with coal, but after taking the coal on board it had sunk so deep that it grounded

in the mud of the harbour. We had already got far out with the little steamer when the large one at last got off. I was now obliged to exchange vessels in order to be received "in a more honourable way." It was not until this took place that I was informed that I was guest and not master, on which account I was obliged to employ the rest of the afternoon in excusing my former violent behaviour, in which, with the help of friendly words, beer, and red wine, I succeeded pretty well, to judge by the mirth which soon began to prevail among my now very numerous Japanese companions.

On the little steamer I had ordered two of my crew whom I had brought with me from the *Vega* to prepare a meal for the Japanese and ourselves. In this way the dinner that had been arranged for us, without my knowledge, became superfluous. I was obliged instead to receive as a gift the provisions and liquors purchased for the dinner, consisting of fowls, eggs, potatoes, red wine and beer, giving at the same time a receipt as a matter of form.

During our excursion on the lake we met with various boats laden with sea-weed, which had been taken up from the bottom of the lake to be used as manure for the neighbouring cultivated fields. Partly among these algæ, partly by dredging, Lieut. Nordquist collected various interesting fresh-water crustacea (Paludina, Melania, Unio, Planorbis &c.,) several sorts of shrimps (a Hippolyte) small fishes, &c. Lake Biwa abounds in fish, and harbours besides a large clumsily-formed species of lizard. In order to make further collections of the animal forms occurring there, Lieut. Nordquist remained at the lake till next day. I, on the other hand, went immediately back to Kioto, arriving there in the evening after nightfall.

After having eaten, along with my two Japanese companions, an unexceptionable European dinner at the inn of the town, kept by Japanese, but arranged in European style, we paid a visit to a company of Japanese dancing-girls.

Kioto competes with Osaka for the honour of having the prettiest dancing-girls. These form a distinct class of young girls, marked by a peculiar variegated dress. They wear besides a peculiar hair-ornament, are much painted, and have their lips coloured black and gold. At the dancing places of greatest note a European is not received, unless he has with him a known native who answers for his courteous behaviour. After taking off his shoes on entering, the visitor is introduced to a separate room with its floor covered with matting and its walls ornamented with Japanese drawings and mottoes, but without other furniture. A small square cushion is given to each of the guests. After they have settled themselves in Japanese fashion, that is to say, squatting cross-legged, pipes and tea are brought in, on which a whole crowd of young girls come in and, chatting pleasantly, settle themselves around the guests, observing all the while complete decency even according to the most exacting European ideas. There is not to be seen here any trace of the effrontery and coarseness which are generally to be found in similar places in Europe. One would almost believe that he was among a crowd of school-girls who had given the sour moral lessons of their governess the slip, and were thinking of nothing else than innocently gossiping away some hours. After a while the dance begins, accompanied by very monotonous music and singing. The slow movements of the legs and arms of the dancers remind us of certain slow and demure scenes from European ballets. There is nothing indecent in this dance, but we learn that there are other dances wilder and less decorous.

The dancing-girls are recruited exclusively from the poorer classes; pretty young girls, to help their parents or to earn some styvers for themselves, selling themselves for a certain time to the owners of the dancing-places, and when the time agreed upon has come to an end returning to their homes, where notwithstanding this they marry without difficulty. All the

dancing-girls therefore are young, many of them pretty even according to European ideas, though their appearance is destroyed in our eyes by the tasteless way in which they paint themselves and colour their lips. Unfortunately I had not time to avail myself of the opportunity which Kioto offers the foreigner of judging with certainty regarding the Japanese taste in female beauty. For here, as at various other Japanese

JAPANESE COURT DRESS.

towns, there are a number of girls who have been officially selected as the most beautiful among the youth of the place. The Japanese may visit them for a certain payment, but to Europeans they do not show themselves willingly, and only for a large sum. When this takes place at any time, it is only a dumb show for a few moments, during which no words are exchanged.

The Governor had promised to carry me round next day to see whatever was remarkable in the town. I was not much delighted at this, because I feared that the whole day would be taken up with inspecting the whole or half-European public offices and schools, which had not the slightest interest for me. My fear however was quite unjustified. The Governor was a man of genius, who, according to the statements of my companions, was reckoned among the first of the contemporary poets of Japan. He immediately declared that he supposed that the new public offices and schools would interest me much less than the old palaces, temples, porcelain and *faïence* manufactories of the town, and that he therefore intended to employ the day I spent under his guidance in showing me the latter.

NOBLE IN ANTIQUE DRESS.

We made a beginning with the old imperial palace Gosho, the most splendid dwelling of Old Japan. It is not however very grand according to European ideas. A very extensive space of ground is here covered with a number of one-story wooden houses, intended for the Emperor, the imperial family, and their suite. The buildings are, like all Japanese houses, divided by movable panels into a number of rooms, richly provided with paintings and gilded ornamentation, but otherwise without a trace of furniture. For the palace now stands uninhabited since the Mikado overthrew the Shogun

dynasty and removed to Tokio. It already gives a striking picture of the change which has taken place in the land. Only the imperial family and the great men of the country were formerly permitted to enter the sacred precincts of Gosho. Now it stands open to every curious native or foreigner, and it has even as an exhibition building been already pressed into the service of industry. Alongside the large buildings there are several small ones, of which one was intended to protect the Emperor-deity during earthquakes; the others formed play-places for the company of grown children who were then permitted to govern the country.

BUDDHIST PRIEST.

Much more remarkable and instructive than the now deserted imperial palace are the numerous temples at Kioto, of which we visited several. We were generally received by the priests in a large vestibule, whose floor was covered with a fine woollen carpet and was provided with tables and chairs of European patterns. The priests first offered us Japanese tea, cigars, and sweetmeats; then we examined some valuable articles exhibited in the room, consisting of bronzes, works in the noble metals, splendid old lacquer work, and a number of famous swords dedicated to the temple. These were the only things that our freethinking Governor treated with reverence; for the rest neither the priests nor their reliques seemed to inspire him with any particular respect.

When a valuable Japanese sword is exhibited one touches neither the hilt nor the scabbard, and of course still less the blade, with the bare hand, but it is taken hold of either with a gloved hand, or with the hand with a handkerchief or piece of cloth wrapped round it. The blade is only half bared, the steel setting is looked at against the light and admired; on the often exceedingly valuable blades which are not mounted, but only provided with a wooden case to protect them from rust, the maker's mark is examined, and so on. As among us in former times, the swordsmith's is the only handicraft which in old times was held in high esteem in Japan, and immense sums were often paid for sword-blades forged by famous masters of the art. Among old Japanese writings are to be found many works specially treating of the making of weapons. But since the swordsmen (*samurai*) have now been forbidden to show themselves armed, old Japanese swords are sold in all the towns by hundreds and thousands, often for a trifle. During our stay in the country I purchased for a comparatively limited sum a fine collection of such weapons. Even those who cannot appreciate the artistic forging of the blade, the steel-setting, and tempering, must admire the exceedingly tasteful casting and embossing of the ornamentation, especially

A SAMURAI.

of the guard-plates of the sword. They are often veritable works of art, unsurpassed in style and execution.

It is not very many years ago since the men who belonged to the *samurai* class never showed themselves abroad without being armed with two swords. Even schoolboys went armed to the first European schools that were established in the country. This gave occasion to several acts of violence during the time which succeeded the opening of the ports, for which reason the European ambassadors some years after requested that carrying the sword in time of peace should be prohibited. To this the Japanese government answered that it would make short work with the minister who should publish such a prohibition. Soon after, however, it gave *permission* to those who desired it to go without weapons, and the carrying of arms soon became so unfashionable that one of the authorities did dare at last to issue a distinct prohibition of it. During our stay in Japan, accordingly, we did not see a single man armed with the two swords formerly in use.

After we had seen and admired the treasures in the temple vestibule, we visited the temple itself. This is always of wood, richly ornamented with carvings and gilding. If it is dedicated to Shinto, there are no images in it, and very few ornaments, if we except a mirror and a large locked press with the doors smashed in, which sometimes occupies the wall opposite the entrance, and in which, as I have already stated, the spirit of the deity is said to dwell. The Shinto temples are in general poor. Many are so inconsiderable as to look almost like dovecotes. They are often completely deserted, so that it is difficult to discover them among the magnificent trees by which they were surrounded. The entrance to the temple is indicated by a gate (*torryi*) of wood, stone, or copper, and here and there are ropes, stretched over the way, to which written prayers and vows are affixed.

Even those who have long studied Japan and its literature

have very little knowledge of the inner essence of Shintoism. This religion is considered by some a pure deism, by others a belief with political aims, the followers of which worship the departed heroes of the country. Of a developed morality this religion is wholly devoid. In the same way it appears to be uncertain whether Shintoism is a survival of the original religion of the country or whether it has been brought from abroad.

GATE ACROSS THE ROAD TO A SHINTO TEMPLE.

Buddhism was introduced from China by Corea. Its temples are more onamented than the Shinto temples, and contain images of deities, bells, drums, holy books, and a great quantity of altar ornaments. The transmigration of souls, and rewards and punishments in a life after this, are doctrines of Buddhism. Outside the temples proper there are to be found in many places large or small images in stone or bronze of the deities of

Buddha. The largest of these consist of colossal statues in bronze (*Daibutsu*), representing Buddha in a sitting position, and themselves forming the screen to a temple with smaller images. A similar statue is also to be found at Kamakura, another at

BUDDHIST TEMPLE AT KOBE.

Tokio, a third at Nara near Kioto, and so on. Some have of late years been sold for the value of the metal; one has in this way been brought to London, and is now exhibited in the Kensington Museum. The metal of the statues consists of an alloy of copper with tin and a little gold, the last named

constituent giving rise to the report that their value is very considerable. To give an idea of the size of some *Daibutsu* statues it may be mentioned that the one at Nara is fifty-three and a half feet high, and that one can crawl into the head through the nose orifices.

Nearly all the *Daibutsu* images are made after nearly the same design, which has been improved from generation to generation until the countenance of the image has received a stamp of benevolence, calm, and majesty, which has probably never been surpassed by the productions of western art. *Daibutsu* images evidently stand in the same relation to the works of private sculptors as folk-poetry to that of individual bards.

As I have before pointed out, the Western taste for the gigantic was not prevalent in Old Japan. It was evidently elegance and neatness, not grandeur, that formed the object towards which the efforts of the artist, the architect, and the gardener were directed. Only the *Daibutsu* images, some bells, and other instruments of worship form exceptions to this. During our excursion at Kioto we passed an inclosure where the walls were built of blocks of stone so colossal, that it was difficult to comprehend how it had been possible to lift and move them with the means that were at the disposal of the Japanese in former times. In the neighbourhood of that place there was a grave, probably the only one of its kind. It is described in the following way in an account of the curiosities of Kioto written by a native:—

"Mimisuka, or the grave of the noses and the ears, was erected by Hideyoshi Taiko, who lived about A.D. 1590. When the military chiefs of this famous man attacked Corea with a hundred and fifty thousand soldiers, he gave orders that they should bring home and show him all the ears and noses of the enemies who were killed in the contest, for it was an old practice in Japan to cut off the enemies' heads to show them to the king or the commander of the army. But it was now impossible to bring the heads of the dead Corean warriors to

Japan, because the distance was too great. Hideyoshi therefore gave the above order, and the ears and noses, which were brought to Japan, were buried together at that place. The grave is 730 feet in circumference, and is 30 feet high."

Kioto is one of the principal places for the manufacture of *faïence*, porcelain, and *cloisonné*. The productions of the ceramic art are, as is well-known, distinguished by their tasteful forms and beautiful colours, and are highly valued by connoisseurs, on which account they are exported on a large scale to Europe and America. The works are numerous and small, and are owned for the most part by families that for a long succession of generations have devoted themselves to the same occupation. The articles are burned in very small furnaces, and are commonly sold in a shop which is close to the place where they are made. The making of porcelain in Japan, therefore, bears the stamp rather of handicraft than of manufacturing industry. The wares gain thereby in respect of art to an almost incredible degree. They have the same relation to the productions of the great European manufactories that the drawing of an artist has to a showily coloured lithograph. But the price is high in proportion, and the Japanese porcelain is too dear for every-day use even in its own country. Nearly all the large sets of table porcelain that I saw in Japan were, therefore, ordered from abroad. The cups which the natives themselves use for rice, tea, and *saki* are, however, of native manufacture; but even in a well-provided Japanese household there is seldom so much porcelain as would be required for a proper coffee-party at home.

In the evening the Governor had invited us to a dinner, which was given in a hall belonging to a literary society in the town. The rooms were partly furnished in European style with tables, chairs, Brussels carpets, &c. The dinner was European in the arrangement of dishes, wines, and speeches. The dishes and wines were abundant and in great variety. The

company were very merry, and the host appeared to be greatly pleased, when I mentioned that at one of the places which I had seen that day I saw a wall adorned by a motto of his composition. He immediately promised to write a similar one on me with reference to my visit to the town, and when a few moments after he had the first line ready, he invited his Japanese guests to write the second. They tried for a good while with merry jests to hit upon some suitable conclusion, but in vain. Early the following morning Mr. Koba-Yaschi came to me, bringing with him a broad strip of silk on which the following was pencilled in bold, nobly-formed characters:

Umi hara-no-hate-made
Akiva-Sumi-watare,

which when translated runs thus:

"As far as the sea extends
The autumn moon spreads her beneficent light."

According to the explanation which I received the piece points out that the autumn moon spreads her beneficent rays as far as to that place in the high north where we wintered. After the above-quoted verse came the following addition in Japanese: "Written by Machimura Masanavo, Governor of Kioto-Fu, to Professor Nordenskiöld, on the occasion of a dinner given to him during the autumn of 1879." The whole besides was signed with the author's common, as well as his poetical, name, and had his seal attached. His poetical name was RIO-SAN, which may be literally translated "Dragon-Mountain."

The poetry of the Japanese is so unlike that of the Western nations that we find it difficult to comprehend the productions of the Japanese poets. Perhaps they ought more correctly to be called poetical mottoes. They play a great part in the intellectual life of the Japanese. Their authors are highly esteemed, and even in the homes of the poorer classes the walls

are often ornamented with strips of silk or paper on which poems are written in large, bold, pencil characters. Among the books I brought home with me are many which contain collections of the writings of private poets and poetesses, or selections from the most famous of the productions of Japanese literature in this department. A roll of drawings which turned up very often represents the sorrowful fate of a famous poetess. First of all she is depicted as a representative Japanese beauty, blooming with youth and grace, then she is represented in different stages of decay, then as dead, then as a half-decayed

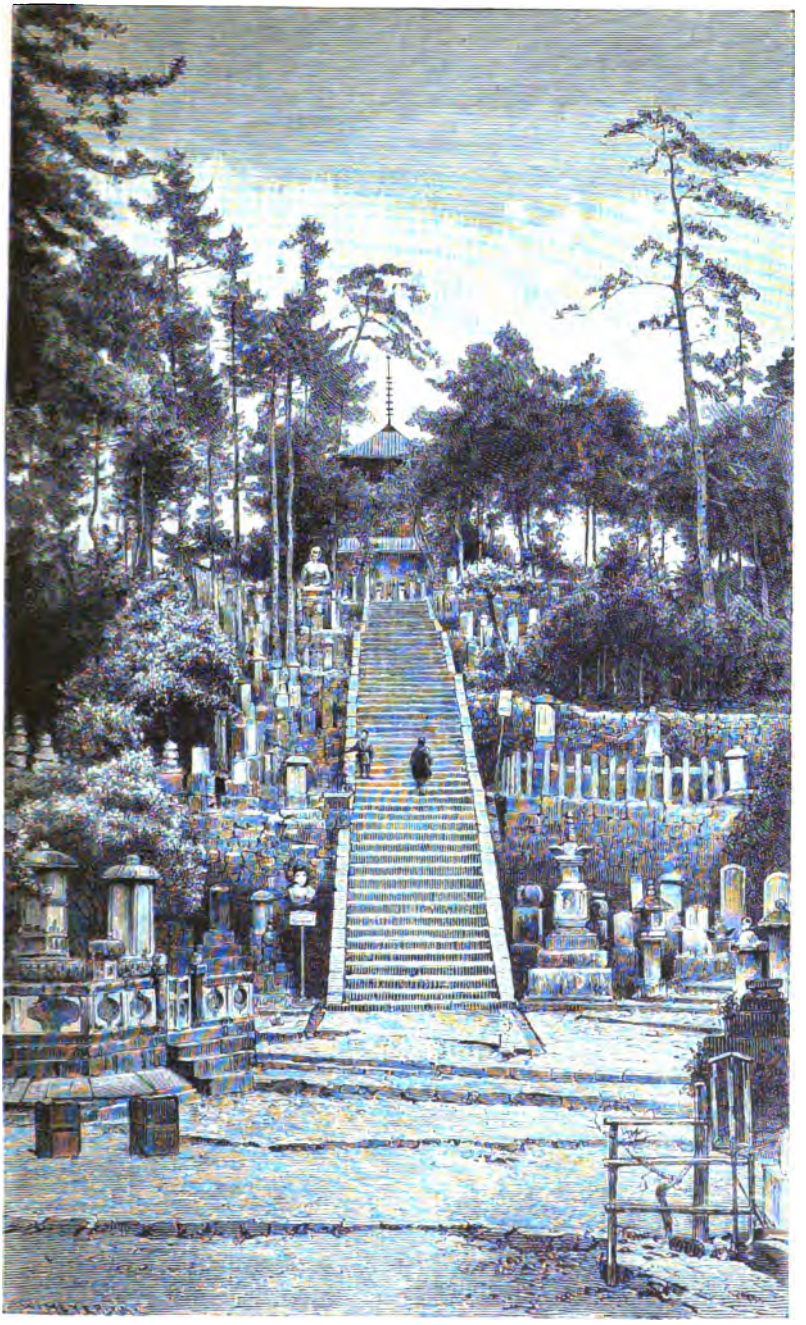
RIO-SAN'S SEAL.

corpse torn asunder by ravens, and finally as a heap of bones. The series ends with a cherry-tree in splendid bloom, into which the heroine, after her body had passed through all the stages of annihilation, has been changed. The cherry-tree in blossom is considered by the Japanese the ideal of beauty in the vegetable kingdom, and during the flowering season of this tree excursions are often undertaken to famous cherry-groves where hour after hour is passed in tranquil admiration of the flower-splendour of the tree. Unfortunately I was so late in getting the

explanation of the beautiful poetical idea that ran through this series of pictures, some of which were executed with execrable truth to nature, that I missed the opportunity of purchasing it.

I was obliged to leave Kioto too early in order to be present at a *fête*, which was given to us at Kobe by the Japanese, Europeans, and Chinese who were interested in our voyage. The entertainment was held in a Buddhist temple without the town, and was very pleasant and agreeable. The Japanese did not seem at all to consider that their temple was desecrated by such an arrangement. In the course of the afternoon for instance there came several pilgrims to the temple. I observed them carefully, and could not mark in their countenances any trace of displeasure at a number of foreigners feasting in the beautiful temple grove whither they had come on pilgrimage. They appeared rather to consider that they had come to the goal of their wanderings at a fortunate moment, and therefore gladly accepted the refreshments that were offered them.

On the morning of the 18th October the *Vega* again weighed anchor, to proceed on her voyage. The course was shaped through the Inland Sea of Japan for Nagasaki. When I requested of the Governor of Kobe permission to land at two places on the way, he not only immediately granted my request, but also sent on the *Vega* the same English-speaking official from his court who had before attended me to Kioto. The weather was clear and fine, so that we had a good opportunity of admiring the magnificent environs of the Inland Sea. They resemble much the landscape in a northern archipelago. The views here are however more monotonous in consequence of their being less variety in the contours of the mountains. Here as at Kobe the hills consist mainly of a species of granite which is exposed to weathering on so large a scale that the hard rocks are nearly everywhere decomposed into a yellow



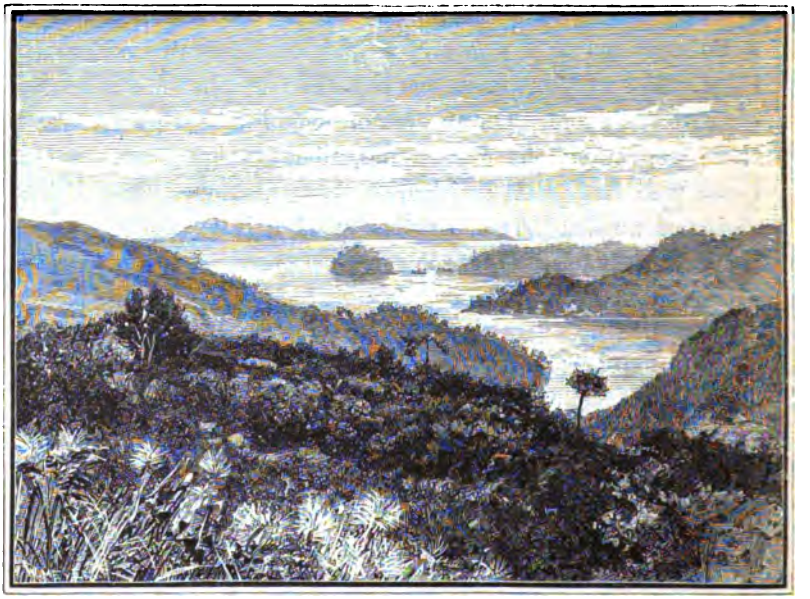
BURYING PLACE AT KIOTO.

sand unfavourable for vegetation. The splendid wild granite cliffs of the north accordingly are absent here. All the hill-tops are evenly rounded, and everywhere, except where there has been a sand-slip, covered with a rich vegetation, which in consequence of the evenness of height of the trees gives little variety to the landscape, which otherwise is among the most beautiful on the globe.

We landed at two places, on the first occasion at Hirosami. Here some fishermens' cabins and some peasants' houses formed a little village at the foot of a high, much-weathered granite ridge. The burying-place was situated near one of the houses, close to the shore. On an area of some hundred square yards there were numerous gravestones, some upright, some fallen. Some were ornamented with fresh flowers, at one was a Shinto shrine of wooden pins, at another stood a bowl with rice and a small *saki* bottle. Our zoologists here made a pretty rich collection of littoral animals, among which may be mentioned a cuttle-fish which had crept down amongst the wet sand, an animal that is industriously searched for and eaten by the natives. Among the cultivated plants we saw here, as many times before in the high-lying parts of the country, an old acquaintance from home, namely buckwheat.

The second time the *Vega* anchored at a peasant village right opposite Shimonoseki. When we landed there came an official on board, courteously declaring that we had no right to land at that place. But he was immediately satisfied and made no more difficulties when he was informed that we had the permission of the Governor, and that instead of the usual pass-port an official from Kobe accompanied the vessel. Shimonoseki has a melancholy reputation in European-Japanese history from the deeds of violence done here by a united English, French, Dutch, and American fleet of seventeen vessels on the 4th and 5th September, 1864, in order to compel the Japanese to open the sound to foreigners, and the unreasonably heavy

compensation which after the victory was won they demanded from the conquered. Although only fifteen years have passed since this occurred, there appears to be no trace of bitter feeling towards Europeans among the inhabitants of the region. At least we were received at the village in the neighbourhood of which we landed with extraordinary kindness. The village was situated at the foot of a rocky ridge, and consisted of a number



ENTRANCE TO NAGASAKI.

of houses arranged in a row along a single street, the fronts of the houses being as usual occupied as shops, places for selling *saki*, and workshops for home industry. The only remarkable things besides that the village had to offer consisted of a Shinto temple surrounded by beautiful trees and a considerable salt-work, which consisted of extensive, shallow, well-planned ponds now nearly dry, into which the sea-water is admitted in order to

evaporate, and from which the condensed salt liquid is afterwards drawn into salt-pans in order that the evaporation may be completed. It was remarkable to observe that several crustacea throve exceedingly well in the very strong brine.

On the surrounding hills we saw thickets of the Japanese wax tree, *Rhus succedaneus*. The wax is pressed out of the berries of this bush with the help of heat. It is used on a large scale in making the lights which the natives themselves burn, and is exported bleached and refined to Europe, where it is sometimes used in the manufacture of lights. Now, however, these wax lights are increasingly superseded by American kerosene oil. The price has fallen so much that the preparation of vegetable wax is now said scarcely to yield a profit.[1]

We left this place next morning, and on the 21st October the *Vega* anchored in the harbour of Nagasaki. My principal intention in visiting this place was to collect fossil plants, which I supposed would be found at the Takasima coal-mine, or in the neighbourhood of the coal-field. In order to find out the locality without delay, I reckoned on the fondness of the Japanese for collecting remarkable objects of all kinds from the animal, vegetable, and mineral kingdoms. I therefore hoped to find in some of the shops where old bronzes, porcelain, weapons, &c., were offered for sale, fossil plants from the neighbourhood, with the locality given. The first day, therefore, I ran about to all the dealers in curiosities, but without success. At last one of the Japanese with whom I conversed told me that an exhibition of the products of nature and art in the region was being arranged, and that among the objects exhibited I might possibly find what I sought for.

Of course I immediately availed myself of the opportunity to

[1] Further information on this point is given by Henry Gribble in "The Preparation of Vegetable Wax" (*Transactions of the Asiatic Society of Japan*, vol. iii. part i. p. 94. Yokohama, 1875).

see one of the many Japanese local exhibitions of which I had heard so much. It was yet in disorder, but I was, at all events, willingly admitted, and thus had an opportunity of seeing much that was instructive to me, especially a collection of rocks from the neighbourhood. Among these I discovered at last, to my great satisfaction, some beautiful fossil plants from Mogi, a place not far from Nagasaki.

Immediately the following morning I started for Mogi, accompanied by the Japanese attendant I had with me from Kobe, and by another adjutant given me by the very obliging governor of Nagasaki. We were to travel across the hills on horseback. I was accompanied, besides my Japanese assistants and a man from the *Vega*, all on horseback, by a number of coolies carrying provisions and other equipment. The Governor had lent me his own horse, which was considered by the Japanese something quite grand. It was a yellowish-brown stallion, not particularly large, but very fine, resembling a Norwegian horse, very gentle and sure-footed. The latter quality was also quite necessary, for the journey began with a ride up a hundred smooth and not very convenient stone steps. Farther on, too, the road, which was exceedingly narrow and often paved with smooth stones, went repeatedly up and down such stairs, not very suitable for a man on horseback, and close to the edge of precipices several hundred feet deep, where a single false step would have cost both the horse and its rider their lives. But as has been said, our horses were sure-footed and sure-eyed, and the riders took care in passing such places not to pull the reins.

None of the mountain regions I have seen in Japan are so well cultivated as the environs of Nagasaki. Every place that is somewhat level, though only several hundred square yards in extent, is used for growing some of the innumerable cultivated plants of the country, principally rice; but as such easily cultivated places occur in only limited numbers, the inhabitants have by industry and hard labour changed the steep slopes of the mountains

into a succession of level terraces rising one above the other, all carefully watered by irrigating conduits.

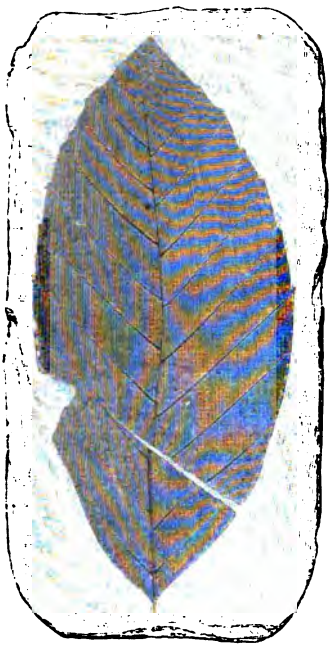
Mogi is a considerable fishing village lying at the seaside twenty kilometres south of Nagasaki in a right line, on the other side of a peninsula occupied by lava beds and volcanic tuffs, which projects from the island Kiushiu, which at that place is nearly cut asunder by deep fjords. No European lives at the place, and of course there is no European inn there. But we got lodgings in the house of one of the principal or richest men in the village, a maker and seller of *saki*, or as we would call him in Swedish, a brandy distiller and publican. Here we were received in a very friendly manner, in clean and elegant rooms, and were waited on by the young and very pretty daughter of our host at the head of a number of other female attendants. It may be supposed that our place of entertainment had no resemblance to a public-house in Sweden. We did not witness here the tipsy behaviour of some human wrecks, and as little some other incidents which might have reminded us of public-house life in Europe. All went on in the distillery and the public-house as calmly and quietly as the work in the house of a well-to-do country squire in Sweden who does not swear and is not quarrelsome.

Saki is a liquor made by fermenting and distilling rice. It is very variable in taste and strength, sometimes resembling inferior Rhine wine, sometimes more like weak grain brandy. Along with *saki* our host also manufactured vinegar, which was made from rice and *saki* residues, which with the addition of some other vegetable substances were allowed to stand and acidify in large jars ranged in rows in the yard.

When my arrival became known I was visited by the principal men of the village. We were soon good friends by the help of a friendly reception, cigars and red wine. Among them the physician of the village was especially of great use to me. . As soon as he became aware of the occasion of my visit he

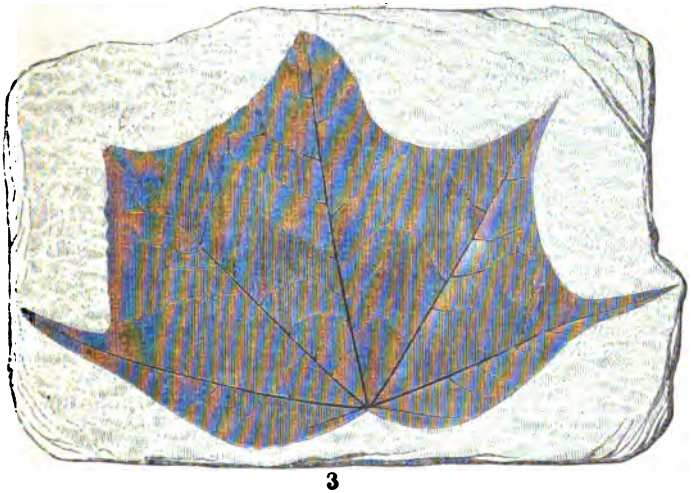
stated that such fossils as I was in search of did indeed occur in the region, but that they were only accessible at low water. I immediately visited the place with the physician and my companions from Nagasaki, and soon discovered several strata containing the finest fossil plants one could desire. During this and the following day I made a rich collection, partly with the assistance of a numerous crowd of children who zealously helped me in collecting. They were partly boys and partly girls, the latter always having a little one on their backs. These little children were generally quite bare-headed. Notwithstanding this they slept with the crown of the head exposed to the hottest sun-bath on the backs of their bustling sisters, who jumped lightly and securely over stocks and stones, and never appeared to have any idea that the burdens on their backs were at all unpleasant or troublesome.

According to Dr. A. G. NATHORST'S examination, the fossil plants which I brought home from this place belong to the more recent Tertiary formation. Our distinguished and acute vegetable palæontologist fixes attention on the point, that we would have expected to find here a fossil flora allied to the recent South Japanese, which is considered to be derived from a Tertiary flora which closely resembles it. There is, however, no such correspondence, for impressions of ferns are almost completely wanting at Mogi, and even of pines there is only a single leaf-bearing variety which closely resembles the Spitzbergen form of *Sequoia Langsdorfii*, Brag. On the other hand, there are met with, in great abundance, the leaves of a species of beech nearly allied to the red beech of America, *Fagus ferruginea*, Ait., but not resembling the recent Japanese varieties of the same family. There were found, besides, leaves of Quercus, Juglans, Populus, Myrica, Salix, Zelkova, Liquidambar, Acer, Prunus, Tilia, &c., resembling leaves of recent types from the forests of Japan, from the forest flora of America, or from the temperate flora of the Himalayas. But



1

2



3

FOSSIL PLANTS FROM MOGI.

1, 2. Beech Leaves (*Fagus ferruginea*, Alt., var. *pliocena*, Nath.). 3. Maple Leaf (*Acer Mono*, Max., var. *pliocena*, Nath.).

as the place where they were found is situated at the sea-shore, quite close to the southern extremity of Japan, it is singular that the tropical or sub-tropical elements of the flora of Japan are here wanting. From this Dr. Nathorst draws the conclusion that these are not, as has been hitherto supposed, the remains of a flora originating in Japan, but that they have since migrated thither from a former continent situated further to the south, which has since disappeared. Dr. Nathorst's examination is not yet completed, but even if this were the case, want of space would not permit me to treat of this point at greater length. I cannot, however, omit to mention that it was highly agreeable to be able to connect with the memory of the *Vega* expedition at least a small contribution from more southerly lands to vegetable palæontology, a branch of knowledge to which our preceding Arctic expeditions yielded new additions of such importance through the fossil herbaria from luxuriant ancient forests which they brought to light from the ice-covered cliffs of Spitzbergen and from the basalt-covered sandstones and schists of the Noursoak Peninsula in Greenland, now so bleak.

FOSSIL PLANT FROM MOGI.
Leaf of *Zelkova Keakii*, Sieb., var. *pliocena*, Nath.

After our return from Mogi I made an excursion to the coal-mine at Takasami, situated on an island some kilometres from the town. Even here I succeeded in bringing together some further contributions to the former flora of the region.

After the inhabitants of Nagasaki, too, had given us a grand parting feast, at which speeches were spoken in Japanese, Chinese, English, French, German, Italian, Dutch, Russian,

Danish, and Swedish, a proof of the mixture of nationalities which prevailed there, the *Vega* again weighed anchor on the 27th October, in order to continue her voyage. We now left Japan to commence in earnest our return, and on our departure we were saluted by the crews of two English gun-boats anchored in the harbour, the *Hornet* and the *Sylvia*, manning the yards and bulwarks. It was natural that the hour of departure, after fifteen months' absence from home, should be looked forward to with joy. But our joy was mixed with a regretful feeling that we were so soon compelled to leave—without the hope of ever returning—the magnificent country and noble people among whom a development is now going on which probably will not only give a new awakening to the old cultured races of Eastern Asia, but will also prepare a new soil for European science, industry, and art. It is difficult to foresee what new undreamed-of blossoms and fruit this soil will yield. But the Europeans are perhaps much mistaken who believe that the question here is only that of clothing an Asiatic feudal state in a modern European dress. Rather the day appears to me to dawn of a time in which the countries round the Mediterranean of eastern Asia will come to play a great part in the further development of the human race.

CHAPTER XIX.

Hong Kong and Canton—Stone-polishing Establishments at Canton—Political Relations in an English Colony—Treatment of the Natives—Voyage to Labuan—Coal Mines there—Excursion to the shore of Borneo—Malay Villages—Singapore—Voyage to Ceylon—Point de Galle—The Gem Mines at Ratnapoora—Visit to a Temple—Purchase of Manuscripts—The Population of Ceylon—Dr. Almquist's Excursion to the Interior of the Island.

SOME days after our arrival at Yokohama the *Vega* was removed to the dock at Yokosuka, there to be protected by coppering against the boring mussels of the warm seas, so injurious to the vessel's hull; the opportunity being also taken advantage of by me to subject the vessel to some trifling repairs and alterations in the fitting up, which were desirable because during the remainder of our voyage we were to sail not in a cold but in a tropical climate. The work took somewhat longer time than was reckoned on, so that it was not until the 21st September that the *Vega* could leave the dock and return to Yokohama. It had originally been my intention to remain in Japan only so long as was necessary for the finishing of this work, during which time opportunity could be given to the officers and crew of the *Vega* to rest after the labours and sufferings of the long winter, to receive and answer letters from home, and to gather from the newspapers the most important occurrences that had taken place during our fourteen months' absence from the regions which are affected by what takes place in the world. But as appears from the foregoing narrative, the

delay was longer than had been intended. This indeed was caused in some degree by the difficulty of tearing ourselves away after only a few days' stay from a people so remarkable, so lovable, and so hospitable as the Japanese, and from a land so magnificently endowed by nature. Besides, when the *Vega* was again ready for sea, it was so near the time for the change of the monsoon, that it was not advisable, and would not have been attended with any saving of time, to sail immediately. For at that season furious storms are wont to rage in these seas, and the wind then prevailing is so unfavourable for sailing from Japan to the southward, that a vessel with the weak steam-power of the *Vega* cruising between Japan and Hong Kong in a head-wind might readily have lost the days saved by an earlier departure. On the other hand, in the end of October and the beginning of November we could, during our passage to Hong Kong, count on a fresh and always favourable breeze. This took place too, so that, leaving Nagasaki on the 27th October, we were able to anchor in the harbour of Hong Kong as early as the 2nd November.

There was of course no prospect of being able to accomplish anything for the benefit of science during a few days' stay in a region which had been examined by naturalists innumerable times before, but I at all events touched at this harbour that I might meet the expressed wish of one of the members of the expedition not to leave eastern Asia without having, during the voyage of the *Vega*, seen something of the so much talked of "heavenly kingdom" so different from all other lands.

For this purpose, however, Hong Kong is an unsuitable place. This rich and flourishing commercial town, which has been created by England's Chinese politics and opium trade, is a British colony with a European stamp, which has little to show of the original Chinese folk-life, although the principal part of its population consists of Chinese. But at the distance of a few hours by steamer from Hong Kong lies the large old

commercial city of Canton, which, though it has long been open to Europeans, is still purely Chinese, with its peatstack-like architecture, its countless population, its temples, prisons, flower-junks, mandarins, pig-tailed street-boys, &c. Most of the members of the expedition made an excursion thither, and were rewarded with innumerable indescribable impressions from Chinese city life. We were everywhere received by the natives in a friendly way,[1] and short as our visit was, it was yet sufficient to dissipate the erroneous impressions which a number of European authors have been pleased to give of the most populous nation. One soon saw that he has to do with an earnest and industrious people, who, indeed, apprehend much —virtue and vice, joy and sorrow—in quite a different way from us, but towards whom we, on that account, by no means have the right to assume the position of superiority which the European is so ready to claim towards coloured races.

The greater portion of my short stay in Canton I employed in wandering about, carried in a sedan-chair—horses cannot be used in the city itself—through the streets, which are partly covered and are lined with open shops, forming, undoubtedly, the most remarkable of the many remarkable things that are to be seen here. The recollection I have of these hours forms, as often happens when one sees much that is new at once, a variegated confusion in which I can now only with difficulty distinguish a connected picture or two. But even if the impressions were clearer and sharper it would be out of the

[1] Yet with one very laughable exception. I wished for zoological purposes to get one of the common Chinese rats, and with this object in view made inquiries through my interpreter at a shed in the street, where rats were said to be cooked for Chinese epicures. But scarcely had the question been put, when the old, grave host broke out in a furious storm of abuse, especially against the interpreter, who was overwhelmed with bitter reproaches for helping a "foreign devil" to make a fool of his own countrymen. All my protestations were in vain, and I had to go away with my object unaccomplished.

question to occupy space with a statement of my own superficial observations. If any one wishes to acquire a knowledge of Chinese manners and customs, he will not want for books on the country, his studies will rather be impeded by their enormous number, and often enough by the inferior nature of their contents. Here I shall only touch upon a single subject, because it especially interested me as a mineralogist, namely, the stone-polishing works of Canton.

It is natural that in a country so populous and rich as China, in which home and home life play so great a *rôle*, much money should be spent on ornaments. We might therefore have expected that precious stones cut and polished would be used here on a great scale, but from what I saw at Canton, the Chinese appear to set much less value on them than either the Hindoo or the European. It appears besides as if the Chinese still set greater value on stones with old "oriental polishing," *i.e.* with polished *rounded* surfaces, than on stones formed according to the mode of polishing now common in Europe with plane facets. Instead the Chinese have a great liking for peculiar, often very well executed, carvings in a great number of different kinds of stones, among which they set the greatest value on nephrite, or, as they themselves call it, "Yii." It is made into rings, bracelets, ornaments of all kinds, vases, small vessels for the table, &c. In Canton there are numerous lapidaries and merchants, whose main business is to make and sell ornaments of this species of stone, which is often valued higher than true precious stones. It was long so important an article of commerce that the place where it was found formed the goal of special caravan roads which entered China by the Yii gate. Amber also appears to have a high value put upon it, especially pieces which inclose insects. Amber is not found in China, but is brought from Europe, is often fictitious, and contains large Chinese beetles with marks of the needles on which they have been impaled. Other less valuable minerals, native or foreign,

are also used, among others, compact varieties of talc or soapstone and of pyrophyllite. But works executed in these minerals do not fetch a price at all comparable to that of nephrite. In the same shop in which I purchased pieces of nephrite carefully placed in separate boxes, I found at the bottom of a dusty chest, along with pieces of quartz and old refuse of various kinds, large crystals, some of which were exceedingly well formed, of translucent topaz. They were sold as quartz for a trifle. I bought besides two pieces of carved topaz, one of which was a large and very fine natural crystal, with a Chinese inscription engraved on its terminal surface, which when translated runs thus: "Literary studies confer honour and distinction and render a man suitable for the court." The other was a somewhat bluish inch-long crystal, at one end of which a human figure, perhaps some Buddhist saint, was sculptured. The polishing of stones is carried on as a home industry, principally in a special part of the town. The workshop is commonly at the side of a small sale counter, in a room on the ground-floor, open to the street. The cutting and polishing of the stones is done, as at home, with metal discs and emery or comminuted corundum, which is said to be found in large quantities in the neighbourhood of Canton.

Large, commodious, well fitted up, but in their exterior very unwieldy river steamers, built after American designs, now run between Hong Kong and Canton. They are commanded by Europeans. The dietary on board is European, and exceedingly good. There are separate saloons for Europeans and Chinese. All over the poop and the after-saloon weapons are hung up so as to be at hand, in case the vessel should be attacked by pirates, or, as happened some years ago, a number of them should mix themselves up with the Chinese passengers with the intention of plundering the vessel.

Hong Kong was ceded to England in consequence of the war of 1842. The then inconsiderable fishing village is now one of

the most important commercial cities of the globe. The harbour is spacious, affording good anchorage, and is well protected by a number of large and small granite islands. The city is built on the largest of these on slopes which rise from the shore towards the interior of the island. On the highest points the wealthiest foreign residents have built their summer houses which are surrounded by beautiful gardens. In winter they live in the city. We here met with a very gratifying reception both from the Governor, Mr. POPE HENNESSY, and from the other inhabitants of the town. The former invited Captain Palander and me to live in the beautiful Governor's residence, gave a dinner, arranged a stately official reception in our honour, and presented to the Expedition a fine collection of dried plants from the exceedingly well-kept botanical garden of the city, which is under the charge of Mr. CHARLES FORD; the latter presented me with an address of welcome at a festive meeting in the City Hall, specially arranged for the purpose and numerously attended by the principal men of the town. The meeting was opened by the Chairman, Mr. KESWICK, with a speech of welcome, after which Mr. J. B. COUGHTRIE read and presented the address, bound in red silk and beautifully illuminated in black, gold, and red, with 414 signatures, among which many were by Chinese. The address ended with a hearty congratulation to us all and a promise of a memorial of our visit to Hong Kong which should indicate the way in which the *Vega* expedition was appreciated there. Some time after our return home Palander and I received from members of the community of Hong Kong a splendid silver vase each.

I here embraced with great interest the opportunity, which my coming in contact with the principal men of the place afforded, of getting a glance into the political relations which prevailed in this vigorous and promising colony. At first sight they appeared to be by no means satisfactory. Peace and unanimity evidently did not prevail; for dissatisfaction with

the Governor was loudly expressed by many of the Europeans settled in Hong Kong. He favoured, they said, the Chinese in an exceedingly partial way, and mitigated their punishments to such a degree that Hong Kong would soon become a place of refuge for all the robbers and thieves of Canton. At the time of our visit an instructive parliamentary debate on a small scale was proceeding in the Legislative Council of the city. The controversy was carried on with a certain bitterness, but with a proper observance of the parliamentary procedure customary in the mother country. The eloquent leader of the opposition had evidently, as is usual in such cases, the general feeling of the Europeans on his side. For they appeared to be pretty well agreed that the only means of protecting themselves against the evil-doers from the great heavenly empire would be to punish them in an inhuman way when they were taken in the act.

To an outsider it appeared, however, that the Governor not only had humanity and justice on his side, but also acted with a true insight into the future. When he came to the colony the corporal punishments to which the Chinese were condemned were exceeding barbarous, although mild in comparison with those common in China—a state of things which the opposition brought forward in defence of the severer punishments. Prisoners were repeatedly flogged with "the cat," often with the result that they were attacked by incurable consumption; they were prepared for the punishment by being subjected for some time to a starvation-diet of rice and water; they were branded when they left the prison, &c. Proceeding on the view that the greatest security for a colony such as Hong Kong lies in the affection which is cherished for it by the numerous native population, the Governor had sought to protect it from unjust attacks by Europeans. Considering that too barbarous punishments are likely rather to promote than to deter from the commission of crimes, in consequence of the protection the

criminal in such a case may reckon upon from sympathising fellow-creatures, and that mild punishments are the first condition of a good protective police, the Governor had diminished the floggings, forbidden the public infliction of the punishment, given a reprimand in cases where "by mistake" or by an evasion of the letter of the law extra strokes had been given to criminals, exchanged "the regulation cat" for the rattan, abolished the preliminary starvation-diet and the branding, improved the prisons, &c. All this was now loudly complained of by the European merchants, but was approved by the Chinese subjects in the colony, who were however dissuaded from making any contrary demonstrations.

When we came afterwards to other English possessions, we found that the inhabitants were often more or less in conflict with the authorities, but nowhere was there anything to prevent the opposition from endeavouring to promote their views by public meetings, by addresses in newspapers and pamphlets. In this way a pretty active political life arises early, and this is probably one of the main conditions of the capacity of the English colonies for self-government, and of their vigour and influence on the surrounding country.

It will in truth be highly interesting to see what influence will be exerted on the great neighbouring empire if Mr. Hennessy's politics with reference to the Chinese settled in Hong Kong be carried out, and they be converted into fellow-citizens conscious that they are protected by law in person and property, that they do not require to crawl in the dust before any authority, and that so long as they keep within the limits of the law they are quite safe from the oppressions of all officials, and in the enjoyment of all the rights and privileges which the English law confers upon the citizen.

Many of the Europeans settled at Hong Kong were convinced that for another thousand years one would be justified in using the expression regarding China: "Thou art what thou wast, and

thou wilt be what thou art." Others again stated that contact with Europeans at Shanghai, Hong Kong, and Singapore, and the accounts given by the emigrants returning to China in thousands from California and Australia are by slow degrees changing the aspect of the world in the "heavenly empire," and thereby preparing for a revolution less violent, but as thorough as that which has recently taken place in Japan. If this comes about, China will be a state that must enter into the calculation when the affairs of the world are settled, and whose power will weigh very heavy in the scales, at least when the fate of Asia is concerned. At Hong Kong and Canton the report was current that the far-sighted Chancellor of the German Empire had taken this factor into calculation in settling his plans for the future.

Already the Chinese took part in the European life. A number of Chinese names, as I have already said, were attached to the address that was presented to me; at the Governor's reception many stout, smiling heads provided with pigtails were seen; and Chinese had taken part in the meetings at which the Governor's scheme of reform was under discussion. There have also existed in the country from time immemorial secret societies, which are said only to wait for a favourable opportunity to endeavour to link their fates to the new paths.[1] The observations that I made at Hong Kong and Canton are, however, too superficial for me to wish to detain my reader with these matters. I accordingly point to the numerous works on these cities published by authors who have lived there as many months or years as I have days, and proceed to sketch the continuation of the voyage of the *Vega*.

Accompanied by the good wishes of many newly acquired friends, we left the harbour of Hong Kong on the morning of the 9th November. It was my original intention to steer our

[1] See on this subject W. A. Pickering, "Chinese Secret Societies" (*Journal of the Straits Branch of the R. Asiatic Society*, 1878, No. 1, pp. 63-84).

course to Manilla, but the loss of time during our long stay in Japan compelled me to give up that plan. The course was shaped, however, not directly for Singapore, but for Labuan, a small English possession on the north side of Borneo. Its northern extremity (the coal mine) lies in 5° 33′ N.L. and 115° 12′ E.L. England took possession of Labuan on account of the coal-scams which are found there, which are of special importance on account of the situation of the island nearly in the midst of the large, numerous, and fertile islands of south-eastern Asia. It was the coal-seams too that attracted me to the place. For I wished to see whether I could not, in the neighbourhood of the equator itself, collect valuable contributions towards ascertaining the nature of the former equatorial climate.

We at first made rapid progress, thanks to a fresh and favourable monsoon wind. But when we reached the so-called belt of calms, the wind ceased completely, and we had now to avail ourselves of steam, which, in consequence of the low power of the *Vega's* engine and a strong counter current, carried us forward so slowly that it was not until the 17th November that we could anchor in the harbour of Labuan.

The largest of the islands belonging to the colony has, with a pretty considerable breadth, a length of 10′ from N.E. to S.W. It is inhabited by some thousands (3,300 in 1863) of Chinese and Malays, together with a few Englishmen, who are either crown officials or employed at the coal mine. The north part of the island has a height of 140 metres above the sea, but towards the south the land sinks to an extensive sandy plain, closely overgrown with bushy thickets and traversed by low marshes. Most of the inhabitants live along the shore of the harbour which bears the now, or perhaps only for the present, indispensable name for English colonies (which on that account conveys little information) of Victoria. The Governor's fine residence lies at a little distance from the harbour town in the

interior of the island, the coal mine on its north side. At the time of our visit the coal company had recently gone into liquidation, and work had therefore been stopped at the mine, but it was hoped that it would soon be resumed. The sandy plain is of little fertility in comparison with the neighbouring tropical lands. It had recently been burned, and was therefore for the most part covered only with bushes, among which stems of high, dried-up, half-burned trees raised themselves, giving to the landscape a resemblance to a northern forest devastated by an accidental fire. In consequence of the fire which had thus passed over the island the plain which, when looked at from a distance appeared to be completely even, was seen everywhere to be studded with crater-formed depressions in the sand, quite similar to the *os*-pits in the *osar* of Scandinavia.[1] On the north side there was sandstone rock rising from the sea with a steep slope six to fifteen metres high. Here tropical nature appeared in all its luxuriance, principally in the valleys which the small streams had excavated in the sandstone strata.

The coal mine is sunk on coal-seams, which come to the surface on the north side of the island. The seams, according to the information I received on the spot, are four in number, with a thickness of 3·3, 0·9, 0·4 and 1·0 metre. They dip at an angle of 30° towards the horizon, and are separated from each other by strata of clay and hard sandstone, which together have a thickness of about fifty metres. Above the uppermost coal-seam there are besides very thick strata of black clay-slate, white hard sandstone with bands of clay, loose sandstone, sandstone mixed with coal, and finally considerable layers of clay-slate and sandstone, which contain fossil marine crustacea, resembling those of the present time. The strata which lie between or in the immediate neighbourhood of the coal seams do not contain any other fossils than those vegetable remains, which are to be described farther

[1] Concerning their formation and origin see a paper by K. Nordenskiöld in *Öfversigt af Vet.-akad. Förh.* 1870, p. 29.

on. Thirty kilometres south of the mine a nearly vertical coal-seam comes to the surface near the harbour, probably belonging to a much older period than that referred to above; and out in the sea, eighteen kilometres from the shore north of the harbour, petroleum rises from the sea-bottom. The manager of the mine supposed from this that the coal-seams came to the surface again at this place. The coal-seams of Labuan are besides, notwithstanding their position in the middle of an enormous, circular, volcanic chain, remarkably free from faults, which shows that the region, during the immense time which has elapsed since these strata have been deposited, has been protected from earthquakes. Even now, according to Wallace, earthquakes are scarcely known in this part of Borneo.

From what has been stated above we may conclude that the coal, sand, and clay strata were deposited in a valley-depression occupied by luxuriant marshy grounds, cut off from the sea, in the extensive land which formly occupied considerable spaces of the sea between the Australian Islands and the continent of Asia. A similar state of things must besides have prevailed over a considerable portion of Borneo. On that island there are coal-seams under approximately similar circumstances to those on Labuan. So far as I know, however, they have not hitherto been closely examined with respect to vegetable palæontology.

At Labuan fossil plants are found, though very sparingly, imbedded in balls of clay ironstone from strata above the two lowermost coal-seams. The upper coal-seams are besides exceedingly rich in resin, which crosses the coal in large veins. From the thickness and conversion into a hard sandstone of the layers of sand lying between and above the coal-seams we may conclude that a very long time, probably hundreds of thousands or millions of years have passed since these coal-seams were formed. They also belong to a quite recent period, during which the vegetation in these regions varied perhaps only to a slight extent from that of the present time. It is, however, too early

to express one's self on this subject, before the fossils which we brought home have been examined by Dr. Nathorst.

Coal mining was stopped for the time, but orders were expected by every post to resume work. The road between the mine and the harbour town was at all events pretty well kept, and Mr. COOKE, one of the directors of the company, still lived at the place. He showed me all possible hospitality during the time I remained on the north side of the island for the purpose of collecting fossils. The rest of the time I was the guest of the acting Governor, Mr. TREACHER, a young and amiable man, who showed me several collections in natural history from Labuan and the neighbouring parts of Borneo, and after our return to Europe sent me a collection of leaves and fruit of the kinds of trees which now grow on the island. I expect that this collection will be very instructive in the study of the fossil plants we brought home with us.

At the steep shore banks on the north coast very fine sections of the sandstone strata, which lie under and above the coal, are visible. While I went along the shore in order to examine these, I visited some Malay huts built on poles. They were surrounded at flood tide by water, at ebb by the dry beach, bare of all vegetation. In order to get inside these huts one must climb a ladder two to two and a half metres high, standing towards the sea. The houses have the same appearance as a warehouse by the seaside at home, and are built very slightly. The floor consisted of a few rattling bamboo splints lying loose, and so thin that I feared they would give way when I stepped upon them. The household articles consisted only of some mats and a pair of cooking vessels. I saw no fireplace; probably fire was lighted on the beach. I could see no reason why this place should be chosen as a dwelling in preference to the neighbouring shore with its luxuriant vegetation, which at the same time was not at all swampy, unless it was for the coolness which arises from the airy situation on the beach, and the protection which

the poles give from the thousands of crawling animals which swarm in the grassy meadows of tropical regions. It is probable also that the mosquitos are less troublesome along the sea-shore than farther into the interior of the country.

Some of my companions saw similar huts during an excursion, which they undertook in the steam launch, to the mouth of a large river debouching on the neighbouring coast of Borneo. Regarding this excursion Dr. Stuxberg gives the following report:

"On the 19th November Palander, Bove, and I, together with two men, undertook an excursion in the steam launch of the *Vega* to the river Kalias debouching right opposite to Labuan. We started at dawn, a little after six o'clock. The course was shaped first north of Pappan Island, then between the many shoals that lie between it and the considerably larger Daat Island, and finally south of the latter island.

"Pappan Island is a small beautiful island, clothed down to high-water mark with a dark green primeval forest. On Daat Island, on the contrary, the primeval forest on the east side has been cut down, and has given place to a new plantation of cocoa-nut trees, the work of a former physician on Labuan, which yields its present owner a considerable revenue.

"We had no little difficulty in finding a way over the sandy bar, which is deposited in front of the river mouth at a distance of a nautical mile and a half to three miles from the coast of Borneo. After several attempts in the course of an hour we at last succeeded in finding the deep channel which leads to the river. It runs close to the mainland on the north side, from Kalias Point to the river mouth proper. At the bar the depth was only a metre, in the deep channel, it varied between 3·5 and 7 metres, in the river mouth it was fourteen to eighteen metres and sometimes more.

"On the south side of the tongue of land, which projects north of the mouth of the Kalias, were found two Malay villages, whose inhabitants appeared to view our passage up the river with curious glances. A crowd of half or wholly naked children began a race along the shore, as soon as they set eyes upon the fast steam launch, probably in order to keep us in sight as long as possible. We now had deep water and steamed up the river without delay. The longed-for visit to some of the Malay villages we thus reserved till our return.

"We steamed about ten or twelve English miles up one of the many winding river arms, when the limited depth compelled us to turn. The vegetation on the mainland, as on the shores of the islands lying near the river-mouth, was everywhere so close that it was nearly impossible to find a place where we could land; everywhere there was the impenetrable primeval forest. Next the mouth of the river this consisted of tall, shady broad-leaved trees, which all had dark green, lustrous, large leaves. Some were in flower, others bore fruit. The greater number consisted of fig trees, whose numerous air-roots twining close on each other formed an impenetrable fence at the river bank. These air-root-bearing trees play an important *rôle* in increasing the area of the land and diminishing that of the water. They send their strong air-roots from the branches and stem far out into the water, and when the roots have reached the bottom, and pushed their way into the mud, they make, by the close basket-work they form, an excellent binding medium for all the new mud which the river carries with it from the higher ground in the interior. It has struck me that the air-root-bearing trees form one of the most important means for the rapid increase of the alluvial land on Borneo. Farther up the river there commenced large stretches of a species of palm, which with its somewhat lighter green and its long sheath-formed leaves was sharply distinguished from the rest of the forest. Sometimes the banks on one side were covered with palms only, on the other with fig-trees only. The palm jungles were not so impenetrable as the fig-tree thickets; the latter preferred the more swampy hollows, while the palms on the other hand grew on the more sandy and less marshy places. Of herbs and underwood there was nowhere any trace.

"During the river voyage we saw now and then single green-coloured kingfishers flying about, and a honeysucker or two, but they were not nearly so numerous as might have been expected in this purely tropical zone. We saw some apes leaping in pairs among the trees, and Palander succeeded in shooting a male. Alligators from one to one and a half metre in length, frightened by the noise of the propeller, throw themselves suddenly into the water. Small land lizards with web-feet jumped forward with surprising rapidity on the water near the banks. This was all we saw of the higher animals.

"After a run of two hours, during which we examined the banks carefully in order to find a landing place, we lay to at the best possible place for seeing what the lower fauna had to offer. It was no easy matter to get to land. The ground was so muddy

that we sank to the knees, and could make our way through the wood only by walking on an intermediate layer of palm leaves and fallen branches. The search for evertebrates did not yield very much. A half-score mollusca, among them a very remarkable naked leech of quite the same colour-marking and raggedness as the bark of tree on which it lived, was all that we could find here. It struck me as very peculiar not to find a single insect group represented. The remarkable poverty in animals must be ascribed, I believe, to the complete absence of herbs and underwood. Animal life was as poor as vegetation was luxuriant and various in different places. Over the landscape a peculiar quietness and stillness rested.

"During our return we visited one of the two Malay villages mentioned above. It consisted of ten different houses, which were built on tall and stout poles out in the water at the mouth of the river, about six to ten metres from the shore. All the houses were built on a common large platform of thick bamboo, which was about a man's height above the water. At right angles to the beach there floated long beams, one end being connected with the land, while the other was anchored close to the platform. From this anchored end a plank rose at a steep angle to the platform. Communication with land was kept up in this way. The houses were nearly all quadrangular, and contained a single room, had raised, not flat roofs, and were provided at one of the shorter sides, near one corner, with a high rectangular door opening, which certainly was not intended to be closed, and on one of the long sides with a square window-opening. The building material was bamboo, from eight to eleven centimetres in thickness, mostly whole, but sometimes cleft. The roof had a thin layer of palm leaves upon it to keep out the rain. The house in its entirety resembled a cage of spills to which the least puff of wind had always free entrance. The floor bent and yielded much, and at the same time was so weak that one could not walk upon it without being afraid of falling through. One half, right opposite the door opening, was overlaid with a thin mat of some plant; it was evidently the sleeping place of the family. Some pieces of cloth was all the clothing we could discover. Of household articles there was scarcely any trace. Nor were there any weapons, arrows, or bows. The fireplace was in one corner of the room; it consisted of an immense ash-heap on some low stones. Beside it stood a rather dirty iron pot. All refuse from meals, bones and mollusc-shells, had been thrown into the water under the floor; there lay now a regular culture-layer, a couple of feet higher than the surrounding

sea-bottom, consisting for the most part of mussel shells. The floor of the room was very dirty and black; it looked as if it had never been in contact with a drop of water. The interior of the whole house struck one as being as poor and wretched as that of a Chukch tent. Its inhabitants appeared scarcely to own more than they stood or walked in, *i.e.* for every person a large piece of cloth round the waist. Small boats lay moored to the platform. They were nothing else than tree-stems hollowed out, without any separate planks at the sides, at most two to two and a half metres long, and capable of carrying only two men. We had met such a boat a little way up the river, rowed by two youths, and laden with palm-leaves; it was not more than five to eight centimetres above the water, and appeared as if it would capsize with the least indiscreet movement on the part of the boatmen. Some dogs of middle size went about loose on the platform; they were at first shy and suspicious of us, and growled a little, but soon allowed themselves to be caressed.

"Of the natives, the Malays, unfortunately we saw at close quarters only some middle-aged men. When we approached the long floating beams which led to the platform, the women and children fled precipitately out of the nearest houses, and by the time we got to the platform, they had fortified themselves in a distant house, where they sat motionless and cast curious glances at us through a hole. The children showed their fear of us by loud crying, kept up the whole time. When we attempted to approach the fugitives, they hastened farther away. We won their favour with some cigarettes, which Palander distributed among them, and with which they were evidently delighted. They had a serious, reserved, perhaps rather indifferent appearance. A physiognomist would perhaps have had difficulty in saying whether their countenances expressed ferocity, determination, or indifference. It appeared as if it would not be easy to bring forth a look of mirth or gladness on their faces.

"At the Malay villages which we visited, some Chinese had a sago plantation. With some Malays as workmen in their service, they were now employed in loading a vessel of light draught with sago meal, of which they appeared to have a large quantity in store. Another vessel had just taken on board its cargo and was starting. The Chinese here made the same favourable impression on me as their countrymen, whom I had seen before in Japan and Hong Kong, and whom I was afterwards to see at Singapore—the impression of an exceedingly industrious, thriving, contented, and cleanly race."

Labuan strikes me as a very suitable starting-point for a naturalist who may wish to explore Borneo. Surrounded by Europeans, but undisturbed by the distractions of a large city, he would have an opportunity of accustoming himself to the climate, which, though rather warm for a dweller in the North, is by no means unhealthy, to get acquainted with the manners and customs of the natives, to acquire a knowledge of the commonest forms of the luxuriant nature, which would otherwise be apt to overwhelm the northern naturalist; in a word, to make such preparations for the journey as are necessary to secure its success. This region of Borneo appears to be one of the least known parts of the Indian Archipelago, and one need not go far from the coast to come to places which are never visited by Europeans. Labuan itself and its immediate neighbourhood have much that is interesting to offer to the observer, and from thence short excursions may be made with ease and without excessive cost to the territory of the Sultan of Bruni, who is favourable to foreigners, and to the mountain Kini Balu, near the northern extremity of Borneo, which is 4,175 metres high, and visible from Labuan. When, before our arrival at Japan, I arranged the plan of our voyage home, I included in it a visit to this mountain, at whose summit a comparatively severe climate must prevail, and whose flora and fauna, therefore, notwithstanding its equatorial position, must offer many points of comparison with those of the lands of the north. But when I was told that the excursion would require weeks, I had to give it up.

On the 12th November, the *Vega* again weighed anchor to continue her voyage by Singapore to Point de Galle in Ceylon. Between Labuan and Singapore our progress was but slow, in consequence of the calm which, as might have been foreseen, prevailed in the sea west of Borneo.

Singapore is situated exactly halfway, when a vessel, starting from Sweden, circumnavigates Asia and Europe. We staid here

from the 28th November to the 4th December, very hospitably received by the citizens of the town, both European and Asiatic, who seemed to vie with the inhabitants of Hong Kong in enthusiasm for the voyage of the *Vega*. A Babel-like confusion of speech prevails in the town from the men of so many different nationalities who live here: Chinese, Malays, Klings, Bengalees, Parsees, Singhalese, Negroes, Arabs, &c. But our stay was all too short for independent studies of the customs and mode of life of these different races, or of the rich vegetable and animal worlds in the neighbourhood of the town. I must refer those who are interested in these subjects to previous descriptions of that region, and to the abundant contributions to a knowledge of it which have been published by the Straits Branch of the Asiatic Society, which was founded here on the 4th November, 1877.

We arrived at Galle on the 15th December, having during our passage from Singapore had a pretty steady and favourable monsoon. While sailing through the Straits of Malacca strong ball-lightning was often seen a little after sunset. The electrical discharges appeared to go on principally from the mountain heights on both sides of the Straits.

I allowed the *Vega* to remain in the harbour of Point de Galle, partly to wait for the mail, partly to give Dr. Almquist an opportunity of collecting lichens on some of the high mountain summits in the interior of the island, and Dr. Kjellman of examining its algæ, while I myself would have time to visit the famous gem-diggings of Ceylon. The return was as good as could have been expected considering our short stay at the place. Dr. Almquist's collection of lichens from the highest mountain of Ceylon, Pedrotalagalla, 2,500 metres high, was very large; Kjellman, by the help of a diver, made a not inconsiderable collection of algæ from the neighbourhood of the harbour; and from an excursion which I undertook in company with Mr. ALEXANDER C. DIXON, of Colombo, to Ratnapoora,

the town of gems, where we were received with special kindness by Mr. COLIN MURRAY, assistant government agent, I brought home a fine collection of the minerals of Ceylon.

Precious stones occur in Ceylon mainly in sand beds, especially at places where streams of water have flowed which have rolled, crumbled down, and washed away a large part of the softer constituents of the sand, so that a gravel has been left remaining which contains considerably more of the harder precious stone layer than the original sandy strata, or the rock from which they originated. Where this natural washing ends, the gem collector begins. He searches for a suitable valley, digs down a greater or less depth from the surface to the layer of clay mixed with coarse sand resting on the rock, which experience has taught him to contain gems.[1] At the washings which I saw, the clayey gravel was taken out of this layer and laid by the side of the hole until three or four cubic metres of it were collected. It was then carried, in shallow, bowl-formed baskets from half a metre to a metre in diameter, to a neighbouring river, where it was washed until all the clay was carried away from the sand. The gems were then picked out, a person with a glance of the eye examining the wet surface of the sand and collecting

[1] Emerson Tennent says on the subject:—The gem collectors penetrate through the recent strata of gravel to the depth of from ten to twenty feet in order to reach a lower deposit, distinguished by the name of *Nellan*, in which the objects of their search are found. This is of so early a formation that it underlies the present beds of rivers, and is generally separated from them or from the superincumbent gravel by a hard crust (called *Kadua*), a few inches in thickness, and so consolidated as to have somewhat the appearance of laterite or sun-burnt brick. The nellan is for the most part horizontal, but occasionally it is raised into an incline as it approaches the base of the hills. It appears to have been deposited previous to the eruption of the basalt, on which in some places it reclines, and to have undergone some alteration from the contact. It consists of water-worn pebbles firmly imbedded in clay, and occasionally there occur large lumps of granite and gneiss, in the hollows under which, as well as in "pockets" in the clay (which from their shape the natives denominate "elephants' footsteps"), gems are frequently found in groups, as if washed in by the current. (E. Tennent, *Ceylon*. London, 1860, i. p. 34.)

whatever had more or less appearance of a precious stone. He then skimmed away with the palm of the hand the upper stratum of sand, and went on in the same way with that below it until the whole mass was examined. The certainty with which he judged in a moment whether there was anything of value among the many thousand grains of sand was wonderful. I endeavoured in a very considerable heap of the gravel thus hastily examined, to find a single small piece of precious stone which had escaped the glance of the examiner, but without success.

The yield is very variable, sometimes abundant, sometimes very small, and though precious stones found in Ceylon are yearly sold for large sums, the industry on the whole is unprofitable, although now and then a favourite of fortune has been enriched by it. The English authorities, therefore, with full justification, consider it demoralising and unfavourable to the development of the otherwise abundant natural resources of the region. For the numerous loose population devotes itself rather to the easy search for precious stones, which is as exciting as play, than to the severer but surer labours of agriculture, and when at any time a rich *find* is made, it is speedily squandered, without a thought of saving for the times when the yield is little or nothing. A large number of the precious stones are polished at special polishing places at Ratnapoora, but the work is very bad, so that the stones which come into the market are often irregular, and have uneven, curved, ill-polished surfaces. Most of them perhaps are sold in the Eastern and Western Indian peninsulas and other parts of Asia, but many are also exported to Europe. The precious stones which are principally found at Ratnapoora, consist of sapphires, commonly blue, but sometimes yellow or violet, sometimes even completely colourless. In the last case they have a lustre resembling that of the diamond.[1] Rubies I saw here only in limited numbers.

[1] Diamonds are wanting in Ceylon. And neither gold nor platinum appears to occur in noteworthy quantity in the gem gravel.

GEM DIGGINGS AT RATNAPOORA.

The precious stones occur in nearly every river valley which runs from the mountain heights in the interior of the island down to the low land. According to a statement by Mr. Tennent (i. p. 33), the river-sand at many places contains so much of the harder minerals that it may be used directly for the polishing of other stones. The same writer, or more correctly Dr. GYGAX, who appears to have written the rather scanty mineralogical contributions to Tennent's famous work, states that a more abundant yield ought to be obtained by working in the solid rock than by the usual method. This idea is completely opposed to the experience of mineralogy. The finest gems, the largest gold nuggets, as is well known, are never, or almost never, found in solid rock, but in loose earthy layers. In such layers in Ceylon the abundance of precious stones, that is to say, of minerals which are *hard, translucent, and strongly lustrous*, is very great, and enormous sums would be obtained if we could add up the value of the mass of precious stones which have been found here for thousands of years back. Already Marco Polo says of Ceylon: "In ista insula nascuntur boni et nobiles rubini et non nascuntur in aliquo loco plus. Et hic nascuntur zafiri et topazii, ametisti, et aliquæ aliæ petræ pretiosæ, et rex istius insulæ habet pulcriorem rubinum de mundo."

But some one perhaps will ask, where is the mother-rock of all these treasures in the soil of Ceylon? The question is easily answered. All these minerals have once been imbedded in the granitic gneiss, which is the principal rock of the region.

In speaking of granite or gneiss in southern lands, or at least in the southern lands we now visited, I must, in the first place, point out that these rocks next the surface of the earth in the south have a much greater resemblance to strata of sand, gravel, and clay than to our granite or gneiss rocks, the type of what is lasting, hard, and unchangeable. The high coast hills, which surround the Inland Sea of Japan, resemble, when seen from

the sea, ridges of sand (*osar*) with sides partly clothed with wood, partly sandy slopes of a light yellow colour, covered by no vegetation. On a closer examination, however, we find that the supposed sandy ridges consist of weathered granitic rocks, in which all possible intermediate stages may be seen between the solid rock and the loose sand. The sand is not stratified, and contains large, loose, rounded blocks *in situ*, completely resembling the erratic blocks in Sweden, although with a more rugged surface. The boundary between the unweathered granite and that which has been converted into sand is often so sharp that a stroke of the hammer separates the crust of granitic sand from the granite blocks. They have an almost fresh surface, and a couple of millimetres within the boundary the rock is quite unaltered. No formation of clay takes place, and the alteration to which the rocks are subjected therefore consists in a crumbling or formation of sand, and not, or at least only to a very small extent, in a chemical change. Even at Hong Kong the principal rock consisted of granite. Here too the surface of the granite rock was quite altered to a very considerable depth, not however to sand, but to a fine, often reddish, clay, thus in quite a different way from that on the coast of the Inland Sea of Japan. Here too one could at many places follow completely the change of the hard granite mass to a clay which still lay *in situ*, but without its being possible to draw so sharp a boundary between the primitive rock and the newly-formed loose earthy layers as at the first-named place. We had opportunities of observing a similar crumbling down of the hard granite at every road-section between Galle, Colombo, and Ratnapoora, with the difference that the granite and gneiss here crumbled down to a coarse sand, which was again bound together by newly-formed hydrated peroxide of iron to a peculiar porous sandstone, called by the natives *cabook*. This sandstone forms the layer lying next the rock in nearly all the hills on that part of the island which we visited.

It evidently belongs to an earlier geological period than the Quaternary, for it is older than the recent formation of valleys and rivers. The *cabook* often contains large, rounded, unweathered granite blocks, quite resembling the rolled-stone blocks in Sweden. In this way there arise at places where the *cabook* stratum has again been broken up and washed away by currents of water, formations which are so bewilderingly like the ridges (*osar*) and hills with erratic blocks in Sweden and Finland that I was astonished when I saw them. I was compelled to resort to the evidence of the palms to convince myself that it was not an illusion which unrolled before me the well-known contours from the downs of my native land. An accurate study of the sandy hills on the Inland Sea of Japan, of the clay cliffs of Hong Kong, and the *cabook* of Ceylon would certainly yield very unexpected contributions to an explanation of the way in which the sand and rolled-stone *osar* of Scandinavia have first arisen. It would show that much which the Swedish geologists still consider to be glacial gravel transported by water and ice, is only the product of a process of weathering or, more correctly, falling asunder, which has gone on in Sweden also on an enormous scale. Even a portion of our Quaternary clays have perhaps had a similar origin, and we find here a simple explanation of the important circumstance, which is not sufficiently attended to by our geologists, that often all the erratic blocks at a place are of the same kind, and resemble in their nature the underlying or neighbouring rocks.

It is this weathering process which has originated the gem sand of Ceylon. Precious stones have been found disseminated in limited numbers in the granite converted into *cabook*. In weathering, the difficultly decomposable precious stones have not been attacked, or attacked only to a limited extent. They have therefore retained their original form and hardness. When in the course of thousands of years streams of water have flowed over the layers of *cabook*, their soft, already half-

weathered constituents have been for the most part changed into a fine mud, and as such washed away, while the hard gems have only been inconsiderably rounded and little diminished in size. The current of water therefore has not been able to wash them far away from the place where they were originally imbedded in the rock, and we now find them collected in the gravel-bed, resting for the most part on the fundamental rock which the stream has left behind, and which afterwards, when the water has changed its course, has been again covered by new layers of mud, clay, and sand. It is this gravel-bed which the natives call *nellan*, and from which they chiefly get their treasures of precious stones.

Of all the kinds of stones which are used as ornaments there are both noble and common varieties, without there being any perceptible difference in their chemical composition. The most skilful chemist would thus have difficulty in finding in their chemical composition the least difference between corundum and sapphire or ruby, between common beryl and emerald, between the precious and the common topaz, between the hyacinth and the common zircon, between precious and common spinel; and every mineralogist knows that there are innumerable intermediate stages between these minerals which are so dissimilar though absolutely identical in composition. This gave the old naturalists occasion to speak of ripe and unripe precious stones. They said that in order to ripen precious stones the heat of the south was required. This transference of well-known circumstances from the vegetable to the mineral kingdom is certainly without justification. It points however to a remarkable and hitherto unexplained circumstance, namely, that the occurrence of precious stones is, with few exceptions, confined to southern regions.[1] Diamonds are found in noteworthy number only in

[1] The only considerable exceptions from this are two localities for precious stones in Southern Siberia and the occurrence of precious opal in

India, Borneo, Brazil, and the Transvaal. Tropical America is the home-land of the emerald, Brazil of the topaz, Ceylon of the sapphire and the hyacinth, Pegu of the ruby, and Persia of the turquoise. With the exception of the diamond the same stones are found also in the north, but in a common form. Thus common sapphire (corundum) is found in Gellivare iron ore so plentifully that the ore from certain openings is difficult to smelt. Common topaz is found in masses by the hundredweight in the neighbourhood of Falun; common emerald is found in thick crystals several feet in length in felspar quarries, in Roslagen, and in Tammela and Kisko parishes in Finland; common spinel occurs abundantly in Åker limestone quarry; common zircon at Brevig in Norway, and turquoise-like but badly coloured stones at Vestanå in Skane. True precious stones, on the other hand, are not found at any of these places. Another remarkable fact in connection with precious stones is that most of those that come into the market are not found in the solid rock, but as loose grains in sand-beds. True jewel mines are few, unproductive, and easily exhausted. From this one would be inclined to suppose that precious stones actually undergo an ennobling process in the warm soil of the south.

During the excursion I undertook from Galle to Ratnapoora, I visited a number of temples in order to procure Pali, Singhalese, and Sanscrit manuscripts; and I put myself in communication with various natives who were supposed to possess such manuscripts. They are now very difficult to get at, and the collection I made was not very large. The books which the temples wished to dispose of have long ago been eagerly brought up by private collectors or handed over to public museums, for example, to the Ceylon Government Oriental Library estab-

Hungary. The latter, however, in consequence of defective hardness and translucency, can scarcely be reckoned among the true precious stones.

lished at Colombo.[1] The collector who remains a considerable time in the region, may however be able to reap a rich after-harvest, less of the classical works preserved in the temples than of the smaller popular writings in the hands of private persons.

We see in Ceylon innumerable descendants of the races who repeatedly subdued larger or smaller portions of the island, or carried on traffic there, as Moormen (Arabs), Hindoos, Jews, Portuguese, Dutchmen, Englishmen, &c., but the main body of the people at all events varies very little, and still consists of the two allied races, Tamils and Singhalese, who for thousands of years back have been settled here. The colour of their skin is very dark, almost black, their hair is not woolly, their features are regular, and their build is exceedingly fine. The children especially, who, while they are small, often go completely naked, with their regular features, their large eyes, and fresh plump bodies, are veritable types of beauty, and the same holds true of most of the youths. Instead of buying in one of the capitals of Europe the right to draw models, often enough with forms which leave much to desire, and which must be used without distinction for Greek or Northern divinities, for heroes or *savants* of the present or former times, an artist ought to make tours of study to the lands of the south, where man does

[1] The Catalogue of Pali, Singhalese, and Sanscrit Manuscripts in the Ceylon Government Oriental Library, Colombo, 1876, includes:—

41 Buddhist canonical books.
71 Other religious writings.
25 Historical works, traditions.
29 Philological works.
16 Literary works.
6 Works on Medicine, Astronomy, &c.

According to Emerson Tennent (i. p. 515), the Rev. R. Spence Hardy has in the *Journal of the Ceylon Branch of the Asiatic Society* for 1848 given the titles of 467 works in Pali, Sanskrit, and Elu, collected by himself during his residence in Ceylon. Of these about eighty are in Sanskrit, 150 in Elu or Singhalese, and the remainder in Pali.

not need to protect himself from the cold with clothes, and where accordingly nakedness is the rule, at least among the poorer classes. The dress which is worn here is commonly convenient and tasteful. Among the Singhalese it consists of a piece of cloth wound round the middle, which hangs down to the knees. The men, who still prefer the convenient national dress to the European, go with the upper part of the body bare. The long hair is held together with a comb which goes right over the head, and among the rich has a large four-cornered projection at the crown. The women protect the upper part of the body with a thin cotton jacket. The priests wear a yellow piece of cloth diagonally over one shoulder. The naked children are ornamented with metal bracelets and with a metal chain round the waist, from which a little plate hangs down between the legs. This plate is often of silver or gold, and is looked upon as an amulet.

The huts of the working men are in general very small, built of earth or *cabook*-bricks, and are rather to be considered as sheds for protection from the rain and sunshine than as houses in the European sense. The richer Singhalese live in extensive "verandas" which are almost open, and are divided into rooms by thin panels, resembling in this respect the Japanese houses. The Japanese genius for ornament, their excellent taste and skill in execution, are however wanting here, but it must also be admitted that in these respects the Japanese stand first among all the peoples of the earth.

In the seaport towns the Singhalese are insufferable by their begging, their loquacity, and the unpleasant custom they have of asking up to ten times as much, while making a bargain, as they are pleased to accept in the end. In the interior of the country the state of things in this respect is much better.

Among the temples which I visited in order to procure Pali books was the so-called "devil's" temple at Ratnapoora, the stateliest idol-house I saw in Ceylon. Most of the temples

were built of wood; all were exceedingly unpretentious, and without the least trace of style. The numerous priests and temple attendants lived in rather squalid and disorderly dwellings in the neighbourhood of the temple. They received me in a friendly way and showed me their books, of which they occasionally sold some. The negotiation several times ended by the

STATUES IN A TEMPLE IN CEYLON.

priest presenting me with the book I wished to purchase and positively refusing to receive compensation in any form. On one occasion the priest stated that he himself was prevented by the precepts of his religion from receiving the purchase-money agreed upon, but said that I might hand it over to some of the

persons standing round. At two of the priests' houses there was a swarm of school-children, who ran busily about with their palm-leaf writing books and writing implements.

The temples were very different in their arrangements, probably on account of the dissimilar usages of the various Buddhist sects to which they belonged. A temple near Colombo contained a large number of wooden images and paintings of gods, or men of more than human size. Most of them stood upright like a guard round a sitting Buddha. I could not observe any dislike on the part of the priests to take the foreigner round their temples. The key, however, was sometimes wanting to some repository, whose contents they were perhaps unwilling to desecrate by showing them to the unbeliever. This was, for instance, the case with the press which contained the devil's bow and arrows, in the temple at Ratnapoora. The temple vessels besides were exceedingly ugly, tasteless, and ill-kept. I seldom saw anything that showed any sign of taste, art, and orderliness. How different from Japan, where all the swords, lacquer work, braziers, teacups, &c., kept in the better temples would deserve a place in some of the art museums of Europe.

In the sketch of the first voyage from Novaya Zemlya to Ceylon, a countryman of Lidner can scarcely avoid giving a picture of "Ceylon's burned up vales." In this respect the following extract from a letter from Dr. Almquist, sketching his journey to the interior of the island may be instructive :—

"Three hours after our arrival at Point de Galle I sat properly stowed away in the mail-coach *en route* for Colombo. As travelling companions I had a European and two Singhalese. As it was already pretty dusk in the evening there was not much of the surrounding landscape visible. We went on the whole night through a forest of tall coco-nut trees whose dark tops were visible far up in the air against the somewhat lighter sky. It was peculiar to see the number of fire-flies flying in every direction, and at every wing-stroke emiting a bright flash. The night air had the warm moistness which is so agreeable in the

tropics. Now and then the sound of the sea penetrated to our ears. For we followed the west coast in a northerly direction. More could not be observed in the course of the night, and all the passengers were soon sunk in deep sleep.

"After seven hours' brisk trot we came to a railway station and continued our journey by rail to Colombo, the capital of Ceylon. As there was nothing special to see or do there, I went on without stopping by the railway, which here bends from the coast to Kandy and other places. The landscape now soon became grander and grander. We had indeed before seen tropical vegetation at several places, but of the luxuriance which here struck the eye we had no conception. The pity was that men had come hither, had cleared and planted.

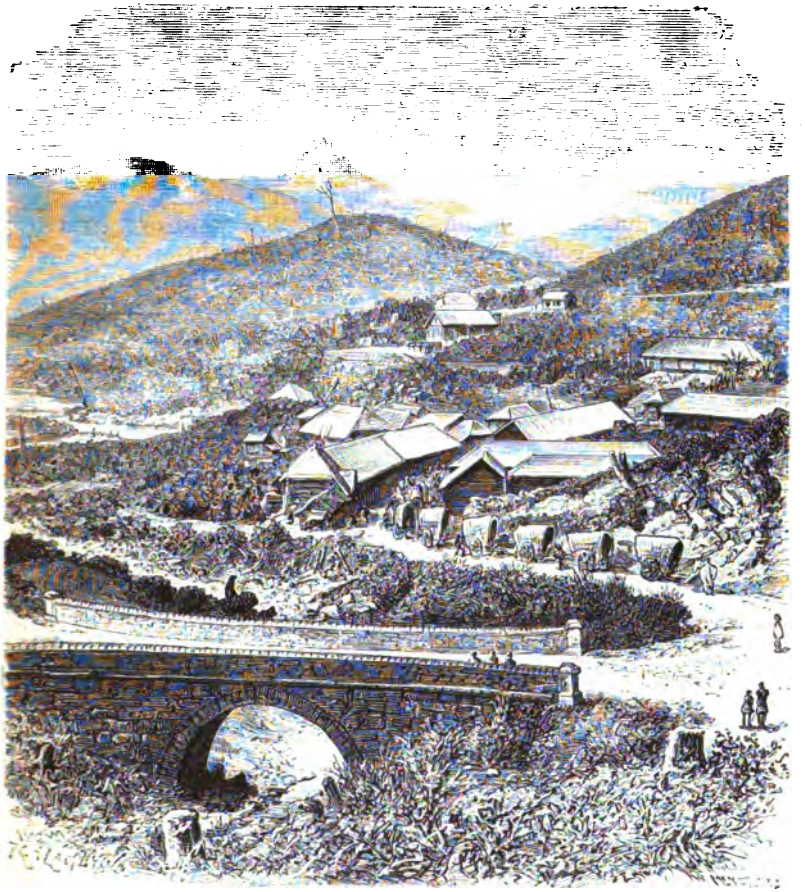
"In the lowlands I saw some cinnamon plantations. Ceylon cinnamon is very dear; in Europe cheaper and inferior sorts are used almost exclusively, and most of the plantations in Ceylon have been abandoned many years ago. Soon the train leaves the lowland and begins to ascend rapidly. The patch of coast country, where the coco-nut trees prevail, is exchanged for a very mountainous landscape; first hills with large open valleys between, then higher continuous mountains with narrow, deep, kettle-like valleys, or open hilly plateaus. In the valleys rice is principally cultivated. The hills and mountain sides were probably originally covered with the most luxuriant primitive forest, but now on all the slopes up to the mountain summits it is cut down, and they are covered with coffee plantations. The coffee-plant is indeed very pretty, but grows at such a distance apart that the ground is everywhere visible between, and this is a wretched covering for luxuriant Ceylon.

"At two o'clock in the afternoon we arrived at the station, Perideniya, the nearest one to Kandy. The famous botanical garden lies in its neighbourhood, and there I had to visit the superintendent of the garden, Dr. THWAITES. This elderly, but still active and enthusiastic naturalist is exceedingly interested in botanical research, and very obliging to all who work in that department. He received me in a very friendly manner, and it was due to him that the programme of my visit there was so full.

"A botanic garden in Ceylon must naturally be something extraordinary. Nowhere else can grander or more luxuriant vegetation be seen than here. The garden has been especially famous for the number of different varieties of trees of immense size which it can show. Besides, all possible better known plants are to be found here, cultivated in the finest specimens. Spices

A COUNTRY PLACE IN CEYLON.

and drugs were specially well represented. Here long tendrils of the black pepper-plant wound themselves up the thick tree-stems, here the cardamon and the ginger flourished, here the



HIGHLAND VIEW IN THE INTERIOR OF CEYLON.
Coffee Plantations; Adam's Peak in the back-ground.

pretty cinnamon, camphor, cinchona, nutmeg, and cocoa trees made a splendid show, here I saw a newly gathered harvest of vanilla. The abundance of things to be seen, learned, and

enjoyed here was incredible. However, the next day I determined on the advice of Dr. Thwaites to make a tour up to the mountain localities proper, in order there to get a better sight of the lichen flora of Ceylon.

"I now travelled south partly by rail, partly by coach, until in the evening I found myself lodged at a 'rest-house' at Rambodde, a thousand metres above the sea, at about the same height accordingly as that at which trees cease to grow in southern Norway. This tropical mountain land reminds one a little, in respect of the contours of the landscape, of the fells of Norway. Here too are found league-long deep valleys, surrounded by high mountain summits and ranges with outlines sharply marked against the horizon. But here they were everywhere overgrown with coffee bushes, or possibly with cinchona plants. The mountain slopes were so laid bare from the bottom all the way up that scarce a tree was left in sight; everywhere so far as the eye could reach only coffee.

"Next day, attended by a Singhalese, I went, or to speak more correctly, climbed farther up the steep coffee plantations. At a height of 1,300 metres above the sea coffee ceases to grow, and we now found some not very extensive tea plantations, and above these the primitive forest commences. At a height of 1,900 metres above the sea there is an extensive open plateau. Up here there is a not inconsiderable place, Novara Elliya, where the governor has a residence, and part of the troops are in barracks during the summer heat. One of the mountains which surround this plateau is Pedrotalegalla, the loftiest mountain of Ceylon, which reaches a height of 2,500 metres above the sea.

"I have ascended not so few mountains, but of none has the ascent been so easy as of this, for a broad footpath ran all the way to the top. Without this path the ascent had been impossible, for an hour's time would have been required for every foot made good through the jungle, so closely is the ground under the lofty trees covered to the top of the mountain with bushes, creepers, or the bamboo. In the evening I returned to my former night-quarters, where I slept well after a walk of thirty-six English miles.

"As I felt myself altogether unable the following day to make any further excursion on foot, I travelled back to Peradeniya by mail-coach. During this journey I had as my travelling companion a Singhalese, whom it was a special pleasure to see at close quarters. One of his big toes was ornamented with a broad ring of silver, both his ears were pierced above, and

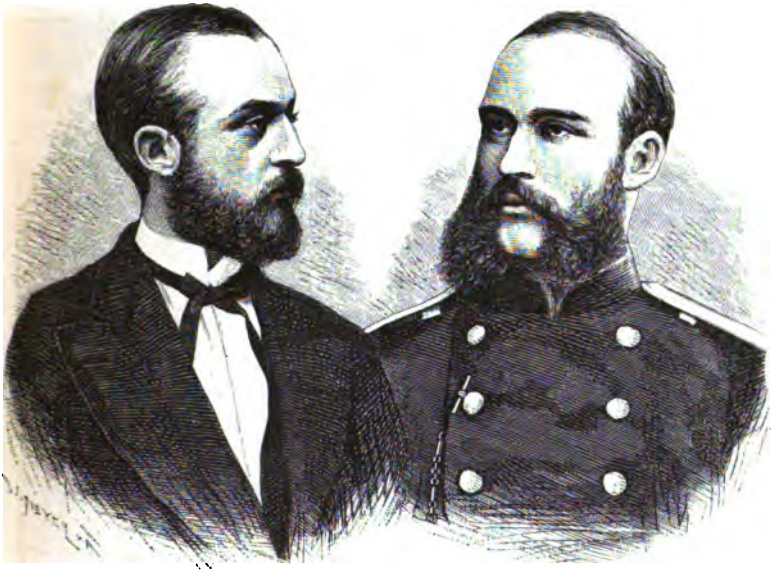
provided with some pendulous ornament, and one side of the nose was likewise perforated, in order that at that place too might he adorn himself with a piece of grandeur. On his head he had, like all Singhalese, a comb by which the hair drawn right upwards is kept in position, as little girls at home are wont to have their hair arranged. As the man did not appear to know a word of English, it was impossible to enter into any closer acquaintance with him.

"At noon on the following day I found myself compelled, by a quite unexpected occurrence, to return precipitately to the coast again. Dr. Thwaites and I had been invited to dinner by his Excellency the Governor. As I was still limping after my long excursion on foot, and besides had not had the forethought to take a dress-suit with me, I considered that, vexatious as it was to decline, I could not accept this gracious invitation, but instead went my way. Thus after six exceedingly pleasant days I came back to Point de Galle and the *Vega*."

CHAPTER XX.

The Voyage Home—Christmas, 1879—Aden—Suez—Cairo—Excursion to the Pyramids and the Mokattam Mountains—Petrified Tree-stems—The Suez Canal—Landing on Sicily by night—Naples—Rome—The Members of the Expedition separate—Lisbon—England—Paris—Copenhagen—Festive Entry into Stockholm—*Fêtes* there—Conclusion.

DURING our stay in Japan and our voyage thence to Ceylon I had endeavoured at least in some degree to preserve the character of the voyage of the *Vega* as a scientific expedition, an attempt which, considering the short time the *Vega* remained at each place, could not yield any very important results, and which besides was rendered difficult, though in a way that was agreeable and flattering to us, by I may almost say the tempestuous hospitality with which the *Vega* men were everywhere received during their visits to the ports of Japan and East Asia. It was besides difficult to find any new untouched field of research in regions which were the seat of culture and civilisation long before the time when the forest began to be cut down and seed to be sown in the Scandinavian North, and which for centuries have formed the goal of exploratory expeditions from all the countries of Europe. I hope however that the *Vega* will leave lasting memorials even of this part of her voyage through the contributions of Stuxberg, Nordquist, Kjellman, and Almquist to the evertebrate fauna and the sea-weed and lichen flora of East Asia, and by my collections of Japanese books, of fossil plants from Mogi and Labuan, &c.



THE SCIENTIFIC MEN OF THE "VEGA."

F. R. Kjellman.
E. Almquist.
A. Stuxberg.
O. Nordquist.

With the new overpowering impression which nature and people exerted on those of us, who now for the first time visited Japan, China, India, Borneo, and Ceylon, it was however specially difficult, during a stay of a few days at each place, to preserve this side of the *Vega* expedition. I therefore determined after leaving Ceylon to let it drop completely, that is, from that point merely to *travel home*. Regarding this part of the voyage of the *Vega* I would thus have very little to say, were it not that an obligation of gratitude compels me to express in a few words the thanks of the *Vega* men for all the honours bestowed upon them, and all the goodwill they enjoyed during the last part of the voyage. For many of my readers this sketch may perhaps be of interest as reminding them of some happy days which they themselves have lived through, and it may even happen that it will not be unwelcome to the friends of geography in a future time to read this description of the way in which the first circumnavigators of Asia and Europe were *fêted* in the ports and capitals of the civilised countries. In this sketch however I am compelled to be as brief as possible, and I must therefore sue for pardon if every instance of hospitality shown us cannot be mentioned.

We started from Point de Galle on the 22nd December, and arrived at Aden on the 7th January. The passage was tedious in consequence of light winds or calms. Christmas Eve we did not celebrate on this occasion, tired as we were of entertainments, in such a festive way as at Pitlekaj, but only with a few Christmas-boxes and some extra treating. On New Year's Eve, on the other hand, the officers in the gun-room were surprised by a deputation from the forecastle clad in *pesks* as Chukches, who came, in good Swedish, mixed with a few words of the Pitlekaj *lingua franca* not yet forgotten, to bring us a salutation from our friends among the ice of the north, thanks for the past and good wishes for the coming year, mixed with Chukch complaints of the great heat hereaway

in the neighbourhood of the equator, which for fur-clad men was said to be altogether unendurable.

We remained at Aden only a couple of days, received in a friendly manner by the then acting Swedish-Norwegian consul, who took us round to the most remarkable points of the desolate environs of this important haven, among others to the immense, but then and generally empty water reservoirs which the English have made in the neighbourhood of the town. No place in the high north, not the granite cliffs of the Seven Islands, or the pebble rocks of Low Island on Spitzbergen, not the mountain sides on the east coast of Novaya Zemlya, or the figure-marked ground at Cape Chelyuskin is so bare of vegetation as the environs of Aden and the parts of the east coast of the Red Sea which we saw. Nor can there be any comparison in respect of the abundance of animal life between the equatorial countries and the Polar regions we have named. On the whole animal life in the coast lands of the highest north, where the mountains are high and surrounded by deep water, appears to be richer in individuals than in the south, and this depends not only on the populousness of the fowl-colonies and the number of large animals of the chase that we find there, but also on the abundance of evertebrates in the sea. At least the dredgings made from the *Vega* during the voyage between Japan and Ceylon gave an exceedingly scanty yield in comparison with our dredgings north of Cape Chelyuskin.

Aden is now an important port of call for the vessels which pass through the Suez Canal from European waters to the Indian Ocean, and also one of the chief places for the export of the productions of Yemen or Arabia Felix. In the latter respect the harbour was of importance as far back as about four hundred years ago, when the Italian, LUDOVICO DE VARTHEMA, was for a considerable time kept a prisoner by the Arab tribes at the place.

In the harbour of Aden the *Vega* was saluted by the firing of twenty-one guns and the hoisting of the Swedish flag at the main-top of an Italian war vessel, the despatch steamer *Esploratore* under the command of Captain AMEZAGA. The *Esploratore* took part in an expedition, consisting of three war vessels, charged with founding an Italian colony at Assab Bay, which cuts into the east coast of Africa, north of Bab-el-Mandeb, on a tract of land purchased for the purpose by Rubbattino, an Italian commercial company. On board was Professor SAPETTO, an elderly man, who had concluded the bargain and had lived at the place for forty years. It was settled that he should be the administrator of the new colony. On board the *Esploratore* were also the *savants* BECCARI and the Marquis DORIA, famous for their extensive travels in the tropics and their valuable scientific labours. The officers of the Italian vessel invited us to a dinner which was one of the pleasantest and gayest of the many entertainments we were present at during our homeward journey. When at the close of it we parted from our hosts they lighted up the way by which we rowed forward over the tranquil waves of the Bay of Aden with blue lights, and the desert mountain sides of the Arabian coast resounded with the hurrahs which were exchanged in the clear, calm night between the representatives of the south and north of Europe.

The *Vega* left Aden, or more correctly its port-town, Steamer Point, on the 9th January, and sailed the following day through Bab-el-Mandeb into the Red Sea. The passage of this sea, which is narrow, but 2,200 kilometres long, was tedious, especially in its northern part, where a strong head wind blew. This caused so great a lowering of the temperature that a film of ice was formed on the fresh-water pools in Cairo, and that we, Polar travellers as we were, had again to put on winter clothes in Egypt itself.

The *Vega* anchored on the 27th January at the now

inconsiderable port, Suez, situated at the southern entrance to the Suez Canal. Most of the scientific men and officers of the *Vega* expedition made an excursion thence to Cairo and the Pyramids, and were everywhere received in a very kind way. Among other things the Egyptian Geographical Society sent a deputation to welcome us under the leadership of the President of the Society, the American, STONE PACHA. He had in his youth visited Sweden, and appeared to have a very pleasant recollection of it. The Geographical Society gave a stately banquet in honour of the *Vega* expedition. An excursion was made to the Great Pyramids, and, as far as the short time permitted, to other remarkable places in and around the heap of ruins of all kinds and from all periods, which forms the capital of the Egypt of to-day. During our visit to the Pyramids the Swedish-Norwegian consul-general, BÖDTKER, gave us a dinner in the European hotel there, and the same evening a ball was given us by the Italian consul-general, DE MARTINO. A day was besides devoted by some of us, in company with M. GUISEPPE HAIMANN, to a short excursion to the Mokattam Mountains, famous for the silicified tree-stems found there. I hoped along with the petrified wood to find some strata of clay-slate or schist with leaf-impressions. I was however unsuccessful in this, but I loaded heavily a carriage drawn by a pair of horses with large and small tree-stems converted into hard flint. These lie spread about in the desert in incredible masses, partly broken up into small pieces, partly as long fallen stems, without root or branches, but in a wonderfully good state of preservation. Probably they had originally lain imbedded in a layer of sand above the present surface of the desert. This layer has afterwards been carried away by storms, leaving the heavy masses of stone as a peculiar stratum upon the desert sand, which is not covered by any grassy sward. No root-stumps were found, and it thus appeared as if the stems had been carried by currents of water

to the place where they were imbedded in the sandy layers and silicified. In their exterior all these petrifactions resemble each other, and by the microscopical examination which has hitherto been made naturalists have only succeeded in distinguishing two species belonging to the family Nicolia, and a palm, a pine, and a leguminous plant, all now extinct. It is possible that among the abundant materials I brought home with me some other types may be discovered by polishing and microscopical examination. Such at least was my expectation in bringing home this large quantity of stones, the transport of which to the *Vega* was attended with a heavy expenditure.

From Cairo we returned, on the 2nd February, to Suez, and the following day the *Vega* weighed anchor to steam through the Suez Canal into the Mediterranean. This gigantic work, created by the genius and perseverance of LESSEPS, which is unsurpassed by the many marvels of construction in the land of the Pharaohs, has not a very striking appearance, for the famous canal runs, like a small river with low banks, through the monotonously yellow plain of the desert. There are no sluices. No bold rock-blastings stand as monuments of difficulties overcome. But proud must every child of our century be when he gazes on this proof that private enterprise can in our day accomplish what world-empires in former times were unable to carry into execution. We touched at Port Said for a few hours on the 5th February, after which we continued our voyage to Naples, the first European port we were to visit.

At Aden and in Egypt I had received several letters and telegrams informing me that great preparations were being made at Naples for our reception, and that repeated inquiries had been addressed to the Swedish consul-general regarding the day of our arrival, questions which naturally it was not so easy to answer, as our vessel, with its weak steam-power, was very dependent on wind and weather. It was hoped that the

Vega might be signalled from the Straits of Messina, but we did not come to the entrance to the Straits until after sunset. I therefore ordered the *Vega* to lie to there for some hours, while Lieut. Bove and I rowed ashore to send off telegrams announcing our arrival in Europe to Sweden, Naples, Rome, and other places. The shore, however, was farther off than we had calculated, and it was quite dark before it was reached. It was not without difficulty that in these circumstances we could get to land through the breakers in the open road quite unknown to us, and then, in coal-black darkness, find our way through thickets of prickly bushes to the railway which here runs along the coast. We had then to go along the railway for a considerable distance before we reached a station from which our telegrams could be despatched. Scarcely had we entered the station when we were surrounded by suspicious railway and coast-guard men, and we considered ourselves fortunate that they had not observed us on the way thither, for they would certainly have taken us for smugglers, whom the coast-guard have the right to salute with sharp shot. Even now we were overwhelmed with questions in a loud and commanding tone, but when they saw to what high personages our telegrams were addressed, and were informed by their countryman Bove, who wore his uniform, to what vessel we belonged, they became very obliging. One of them accompanied us back to our boat, after providing us with excellent torches which spread abundant light around our footsteps. They were much needed, for we were now compelled to share the astonishment of our guide that in the darkness we had succeeded in making our way over the rugged hills covered with cactus plants and bushy thickets between the railway and the coast, and along a railway viaduct which we had passed on our way to the station without having any idea of it. It was the last adventure of the voyage of the *Vega*, and my first landing on the glorious soil of Italy.

On the 14th February, at 1 P.M., the *Vega* arrived at Naples.

At Capri a flag-ornamented steamer from Sorrento met us; somewhat later, another from Naples, both of which accompanied us to the harbour. Here the Swedish expedition was saluted by an American war-vessel, the *Wyoming*, with twenty-one guns. The harbour swarmed with boats adorned with flags. Scarcely had the *Vega* anchored—or more correctly been moored to a buoy—when the envoy LINDSTRAND, the Swedish-Norwegian consul CLAUSEN, Prince TEANO, president of the Geographical Society, Commander MARTIN FRANKLIN, Commendatore NEGRI, and others came on board. The last-named, who nearly two years before had made a special journey to Sweden to be present at the departure of the *Vega*, now came from Turin commissioned by the Italian government, and deputed by the municipalities of Florence and Venice, the Turin Academy of Sciences, and several Italian and foreign geographical societies, to welcome the Expedition, which had now brought its labours to a happy issue.

After Herr Lindstrand, as King Oscar's representative, had welcomed the Expedition to Europe, and publicly conferred Swedish decorations on Palander and me, and two adjutants of the Italian Ministry of Marine had likewise distributed Italian orders to some of the *Vega* men, some short speeches were exchanged, on which the members of the Expedition, accompanied by the persons enumerated above, landed in the Admiral's steam-launch under a salute of twenty-one guns from the Italian guard-ship. On the landing-quay, where a large crowd of the inhabitants of the city was assembled, the Swedish seafarers were received by the Syndic of Naples, Count GIUSSO, accompanied by a deputation from the municipality, &c. Here we were taken, between rows of enthusiastic students, in the gala carriages of the municipality, to the Hotel Royal des Étrangeres, where a handsome suite of apartments, along with equipages and numerous attendants, was placed at our disposal. We were there received by the committee in

charge of the festivities, Prince BELMONTE and Cavalier RICCIO, who afterwards, during our stay in the city, in the kindest way arranged everything to make our stay there festive and agreeable.

On Sunday the 15th several deputations were received, among them one from the University. A beautifully-bound address was presented by "Ateneo Benjamino Franklin," and a number of official visits were made and received. We dined with the Swedish-Norwegian consul, Clausen. On Monday the 16th an address was presented from "Scuola d'Applicazione per gl'Ingenieri," and from "Neapolitana Archæologiæ, Litterarum et Artium Academia," a song of welcome in Latin, written by Professor ANTONIO MIRABELLI. Then followed a grand dinner given by the municipality of the city in a hall of the hotel, which was now inaugurated and was named the *Vega* Hall, and was on this occasion ornamented with the royal cipher, the Swedish and Italian flags, &c. In the evening there was a gala representation at San Carlo, where the members of the Expedition scattered among the different boxes were saluted with repeated loud cries of "Bravo!"—On Tuesday the 17th the Committee had arranged an excursion to Lake Averno, the Temple of Serapis, and other places famous in a geological and historical respect, situated to the north-west of Naples. Prince URUSOV entertained some of the members of the Expedition to dinner. There was an afternoon musical entertainment at the "Società Filarmonica," where there was a numerous attendance of persons moving in the first circles in the city.—Wednesday the 18th, excursion along with the Committee to Pompeii, where the Swedish guests were received by the famous superintendent of the excavations, Director RUGGIERI. Breakfast was eaten with merry jests and gay speeches in a splendid Roman bath, still in good preservation, excavations were undertaken, &c. In the afternoon there was a grand dinner, followed by a reception by the admiral in

command, and a festive representation at the Bellini Theatre.—Thursday the 19th, Dr. FRANZ KÜHN, arrived from Vienna, deputed by the Geographical Society there to welcome us. Excursion in company with Professor PALMIERI and the Committee to Vesuvius, which at the time of our visit was emitting thick columns of smoke, was pouring out a stream of lava, and casting out masses of glowing stone. We ascended the border of the crater, not without inconvenience from the heat of the half-solidified lava streams over which we walked, from the gases escaping from the crater, and from the red-hot stones flung out of it. The new railway, not then ready, was inspected, and the observatory visited. We dined with the Committee at the hotel.—Friday the 20th, journey to Rome, where the members of the Expedition arrived at 2 P.M., and were, in the same way as at Naples, received in a festive manner by the Syndic of the city, Prince RUSPOLI, president and director of the Geographical Society, by members of the University, the Scandinavian Union, &c. Carriages met the Swedish guests, in which they were taken past the Swedish-Norwegian minister's hotel, decked with innumerable flags, to Albergo di Roma in the Corso, where a splendid suite of apartments, along with equipages, was placed at the disposal of the Expedition. In the evening we dined with the Swedish minister, and were afterwards received by Prince PALLAVICINI at his magnificent palace.—Saturday the 21st, visit to the Chamber of Deputies, private excursions, dinner given by the Duke NICOLAS of Leuchtenberg, to Nordenskiöld and Nordquist.—Sunday the 22nd, public meeting of the Geograpical Society, at which its grand gold medal was presented to Nordenskiöld. In the evening a grand dinner, given by the Geographical Society, in the Continental Hotel. Among the toasts which were drunk may be mentioned one to the King of Sweden and Norway, proposed in a very warm and eloquent speech by the Premier, CAIROLI; to Nordenskiöld, by Prince Teano; to Palander, by

the Minister of Marine, Admiral ACTON; to the other members of the Expedition, to its munificent patrons, Oscar Dickson and Alexander Sibiriakoff, to Bove, the Italian officer, who took part in it, &c.—Monday the 23rd. Audience of the King. In the evening a grand reception at the Palazzo Teano, where almost all that was distinguished and splendid of Roman society appeared to be assembled.—Tuesday the 24th. Dined at the Quirinal with King Humbert. There were present, besides the King and his suite, the Swedish minister, the members of the *Vega* expedition, Prince Teano, President of the Geographical Society; Commendatore Negri; Cairoli, Premier; Acton, Minister of Marine; MALVANO, Secretary of the Cabinet; Major BARATIERI, and the Italian naval officer, EUGENIO PARENT, a member of the Swedish Polar expedition of 1872-3, and others. In the evening, reception by the English minister, Sir A. B. PAGET, and a beautifully arranged *fête* at the Scandinavian Union, at which a number of enthusiastic speeches were made, and flowers and printed verses were distributed.—Wednesday the 25th. Farewell visits. Some of the members of the Expedition travelled north by rail. Captain Palander made an excursion to Spezzia to take part in a cruise on the large ironclad *Duilio*. The others remained some days longer in Rome in order to see its lions, undisturbed by official *fêtes*.

While the *Vega* lay in the harbour of Naples she was literally exposed to storming by visitors. The crew were on several occasions invited to the theatres there by the managers. Excursions to Pompeii had besides been arranged for them by the consul for the united kingdoms, Clausen, who spared no pains to make the stay of the expedition at Naples honouring to the mother-country and as pleasant as possible to the guests, as well as in arranging the more formal details of the visit. We had besides the joy of meeting in Italy our comrade from the severe wintering of 1872-3, Eugenio Parent, who soon

after had the misfortune to be in the tower of the ironclad *Duilio*, when the large Armstrong cannon placed there burst, and the wonderful good fortune to escape with life and without being seriously hurt from this dreadful accident. The only mishap on board the *Vega* during the latter part of her long voyage home occurred besides in the harbour of Naples, one of the sailors who was keeping back an enthusiastic crowd of people who stormed the *Vega*, being thrown down from the bulwarks with the result that he broke an arm.[1]

On the 29th February the *Vega* left the harbour of Naples, but no longer with her staff complete. Doctors Kjellman, Almquist, and Stuxberg, and Lieut. Nordquist had preferred the land route from Italy to Stockholm to the long *détour* by sea, and Lieut. Bove was obliged, by family circumstances, to leave the *Vega* at Naples. We, however, all met again at Stockholm. At our departure from Naples the gunroom *personnel* thus consisted only of me, Captain Palander, and Lieuts. Brusewitz and Hovgaard.

Through M. A. RABAUT, President of the young, but already so well known Geographical Society of Marseilles, I had received repeated invitations to visit along with my companions the birthplace of Pytheas, the first Polar explorer and the discoverer of the Scandinavian Peninsula. With great reluctance I was compelled to decline this invitation. We had to hasten home, and I wished to save some days for a visit to the fatherland of HENRY the Navigator and VASCO DA GAMA.

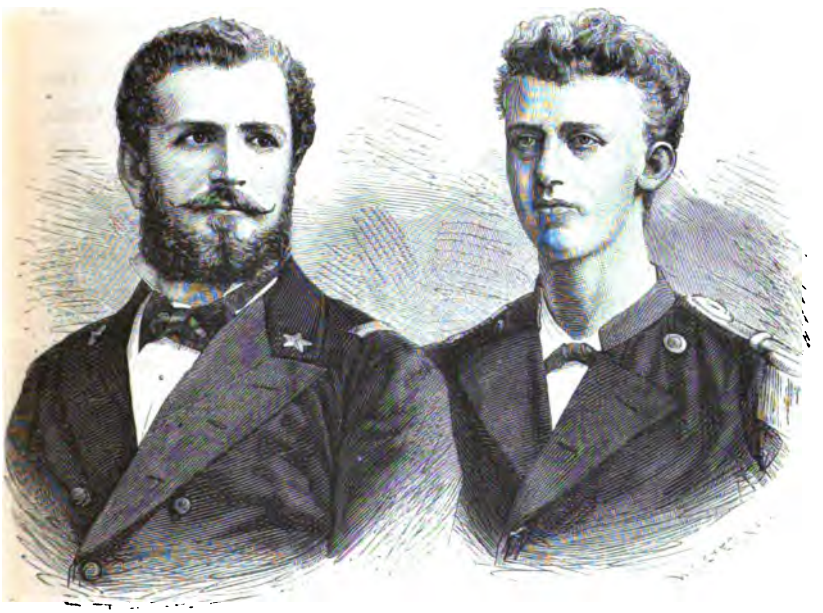
We sailed through the Straits of Gibraltar on the 9th March, and anchored in the harbour of Lisbon on the 11th March at 2 P.M. The following day we made an excursion to the beautiful palace of Cintra, situated about five Portuguese miles from the capital. On Saturday we were received in audience

[1] An accident also happened during the first half of the expedition, the steersman, in backing among drift-ice, having been thrown over the wheel and hurt very seriously.

by the King, Dom LUIZ, of Portugal, who, a seaman himself, appeared to take a great interest in the voyage of the *Vega*. Later in the day the Swedish minister in Lisbon gave a dinner, to which were invited the President of the Portuguese Council, the Minister of Foreign Affairs, the members of the Diplomatic Corps, and others, ending in the evening with a grand reception. On Monday the 15th we were present by special invitation at a meeting of the Geographical Society, at which the newly-returned African travellers, BRITO-CAPELLO and IVEN, gave addresses. Here I had besides the great pleasure of meeting the famous African traveller, Major SERPA PINTO. The King at the same time honoured us with decorations, and at its meeting on the 10th March the Portuguese Chamber of Deputies resolved, on the motion of the Deputies ENNES and ALFREDO, to express its welcome and good wishes in a congratulatory address to the *Vega* men.

We weighed anchor again on the 15th March. We were favoured at first with a fresh breeze and made rapid progress, but at the entrance to the Channel we met with a steady head-wind, so that it was not until the evening of the 25th March, considerably later than we had counted on, that we could anchor in the harbour of Falmouth, not, as was first intended, in that of Portsmouth. We thus missed some preparations which had been made at the latter place to welcome us to the land which stands first in the line of those that have sent out explorers to the Polar Seas. We besides missed a banquet which the Royal Geographical Society had arranged in honour of the *Vega* expedition, at which the Prince of Wales was to have presided, and which now, in the midst of the Easter holidays and a keenly-contested parliamentary election, could not be held.[1] Our stay in England, at all events, was exceedingly

[1] Further particulars on this point are given in the Annual Address on the Progress of Geography by the Right Hon. the Earl of Northbrook (*Proceedings of the Royal Geographical Society*, 1880, p. 401).



THE OFFICERS OF THE "VEGA."

E. Bruzewitz.

C. Bove. A. Hovgaard.

pleasant. Palander and I travelled on the night before Good Friday to London, where we were received at the railway station by the Swedish minister, Count PIPER, and a large number of our countrymen living in London. Count Piper carried me to my future host, the distinguished Secretary of the Geographical Society and famous Arctician and geographical writer, CLEMENTS R. MARKHAM, who did everything to make my stay in London as pleasant and instructive as possible. Saturday was spent in paying visits. On Easter Sunday Consul-General RICHTER gave a lunch in the Continental Hotel, to which a considerable number of Scandinavians and Englishmen were invited. The same evening we dined with the famous Arctic traveller, Sir ALLEN YOUNG. On Monday we were invited by the Earl of NORTHBROOK, President of the Geographical Society,[1] to his country seat, Stratton, near Winchester. Here we saw the way—an exceedingly quiet one—in which an English parliamentary election goes on. The same day we paid a visit to Mr. SPOTTISWOODE, the President of the Royal Society, at his magnificent country seat, in the neighbourhood of London. Here I saw several instructive experiments with very large machines for the production of light by electric discharges in highly rarified air. Wednesday the 31st, grand dinner at the Swedish minister's, and in the evening of the same day a Scandinavian *fête* in the Freemasons' Hall, at which there were great rejoicings according to old northern usages.

We started for Paris on the night before the 1st April. We went by Boulogne-sur-Mer, whose Chamber of Commerce had invited us to a *fête* to celebrate the first landing of the *Vega* men on the soil of France after the North-east Passage was achieved. Several of the authorities of the town and

[1] During our visit to London we had no opportunity of taking part in any of the meetings of the Society, but some time after the Society gave Palander the Founder's Gold Medal (I had in 1869 obtained the same distinction) and elected me an Honorary Corresponding Member.

Dr. HAMY, a delegate from the Geographical Society of Paris met us in the waiting-room at the station. Here a breakfast had been arranged, in the course of which we were presented to a number of eminent persons of the place, with whom we afterwards passed the greater part of the day in the most agreeable way. After making several excursions in the neighbourhood of the town and paying the necessary official visits, we partook of a festive dinner arranged by the municipality. From Boulogne we travelled by night to Paris, arriving there on the 2nd April at 7 A.M.

Notwithstanding the early morning hour we were received here at the station in a festive way by the Swedish-Norwegian minister and the *personnel* of the Legation, a deputation from the Geographical Society of Paris, and a considerable number of the members of the Scandinavian colony in the capital of France. The famous Madagascar traveller, GRANDIDIER, President of the Geographical Society's Central Committee, welcomed us, with lively expressions of assent from the surrounding crowd. We were invited during our stay in the city to live with our countryman, A. NOBEL, in a very comfortable villa belonging to him, Rue Malakoff, No. 53, and I cannot sufficiently commend the liberal way in which he here discharged the duties of a host and assisted us during our stay in Paris, which, though very agreeable and honouring to us, demanded an extraordinary amount of exertion.

Our reception in Paris was magnificent, and it appeared as if the metropolis of the world wished to show by the way in which she honoured a feat of navigation that it is not without reason that she bears on her shield a vessel surrounded by swelling billows. It is a pleasant duty for me here to offer my thanks for all the goodwill we, during those memorable days, enjoyed on the part of the President of the Republic, of Admiral LA RONCIÈRE LE NOURY, President of the Geographical Society, his colleague, M. HECHT, M. MAUNOIR, the Secretary of

the Society, M. QUATREFAGE, and M. DAUBRÉE, members of the Institute, not to forget many other Frenchmen and Scandinavians. Among the *fêtes* of Paris I must confine myself to an enumeration of the principal ones.

Friday, the 2nd April. Public *séance de réception* by the Geographical Society in the Cirque des Champs Elysée in the presence of a very large and select audience. Admiral La Roncière delivered the speech on this occasion, which I replied to by giving a pretty full account of the Swedish Arctic expeditions, on which the President handed me the large gold medal of the Society "as a proof of the interest which the public and the geographers of France take in the voyage of the *Vega*." Dined the same day with the Swedish-Norwegian minister, SIBBERN.—Saturday the 3rd. Invitation to a festive meeting of delegates from twenty-eight learned societies in France in the amphitheatre of the Sorbonne.[1] We were greeted by the Minister of Education in a masterly and eloquent speech, after which he conferred upon us, on the part of the Republic, Commander's and Officer's Insignia of the French Legion of Honour. "A reward," as the Minister of the *Republic* expressed himself, "for the blood of the brave and the sleepless nights of the learned." After that an official dinner and reception by M. Jules Ferry.—On Sunday the 4th, an address was presented from the Scandinavian Union, under the presidency of Herr Fortmeijer. In the evening a brilliant entertainment on a large scale given by the Scandinavian Union in the Hotel Continental. Among those present may be mentioned Prince OSCAR of Sweden, the President of the *Fête* Committee, Herr JENSEN, Fru KRISTINA NILSON-ROUZEAUD the Danish minister, the Swedish embassy, members of the Russian embassy, a large number of Scandinavian artists, many

[1] These are enumerated in the *Bulletin de la Société de Géographie*, Mai, 1880, p. 463. In the same part (p. 450) there is also a report of the speeches made at the *séance de réception*.

of the principal representatives of the French and foreign press, and lastly, what ought perhaps to have been mentioned first, a flower-garden of ladies, of which every dweller in the north might feel proud.—Monday the 5th. Meeting of the Institute in its well-known hall, with speeches of welcome. Hence we were conducted to a grand festive reception, arranged beforehand to the minutest details by the Municipal Council, in "la Salle des États," situated in that part of the Tuileries where the Geographical Congress was held in 1878. The hall and the ascent to it were richly ornamented with French tricolours and Swedish flags, beautiful Gobelins, and living plants. A number of speeches were made, after which the President of the Municipal Council, on the part of the City of Paris, presented to me a large, artistically executed medal as a memorial of the voyage of the *Vega*.[1] In the evening a grand dinner was given by the Société de Geographie, with several eloquent speeches: for King Oscar (General Pittie), for President Grévy, for the prosperity of France (Prince Oscar), for the *Vega* expedition (M. Quatrefage), and so on.—Tuesday the 6th. Dinner given by the President of the Republic, M. Grévy, to Prince Oscar and the *Vega* men then in Paris.—Wednesday the 7th. Dinner given to a numerous and select company of French *savants* by the then President of the Geographical Society and of the Institute, M. A. Daubrée.—Thursday the 8th. Dinner to a small circle at Victor Hugo's house, where the elderly poet and youthful-minded enthusiast in very warm, and I need not say eloquent, words congratulated me on the accomplishment of my task. Reception there the same evening.

Here ended our visit to the capital of France. Thoroughly

[1] The medal was accompanied by an "extrait du registre de procès-verbaux du conseil municipal de la ville de Paris," a caligraphic masterpiece illuminated in various colours and gold. The *Conseil municipal* also ordered a detailed description of the *fête* to be printed, with the title *Relation officielle de le réception de M. le Professeur Nordenskiöld par le conseil municipal de Paris le lundi 5 Avril* 1880.

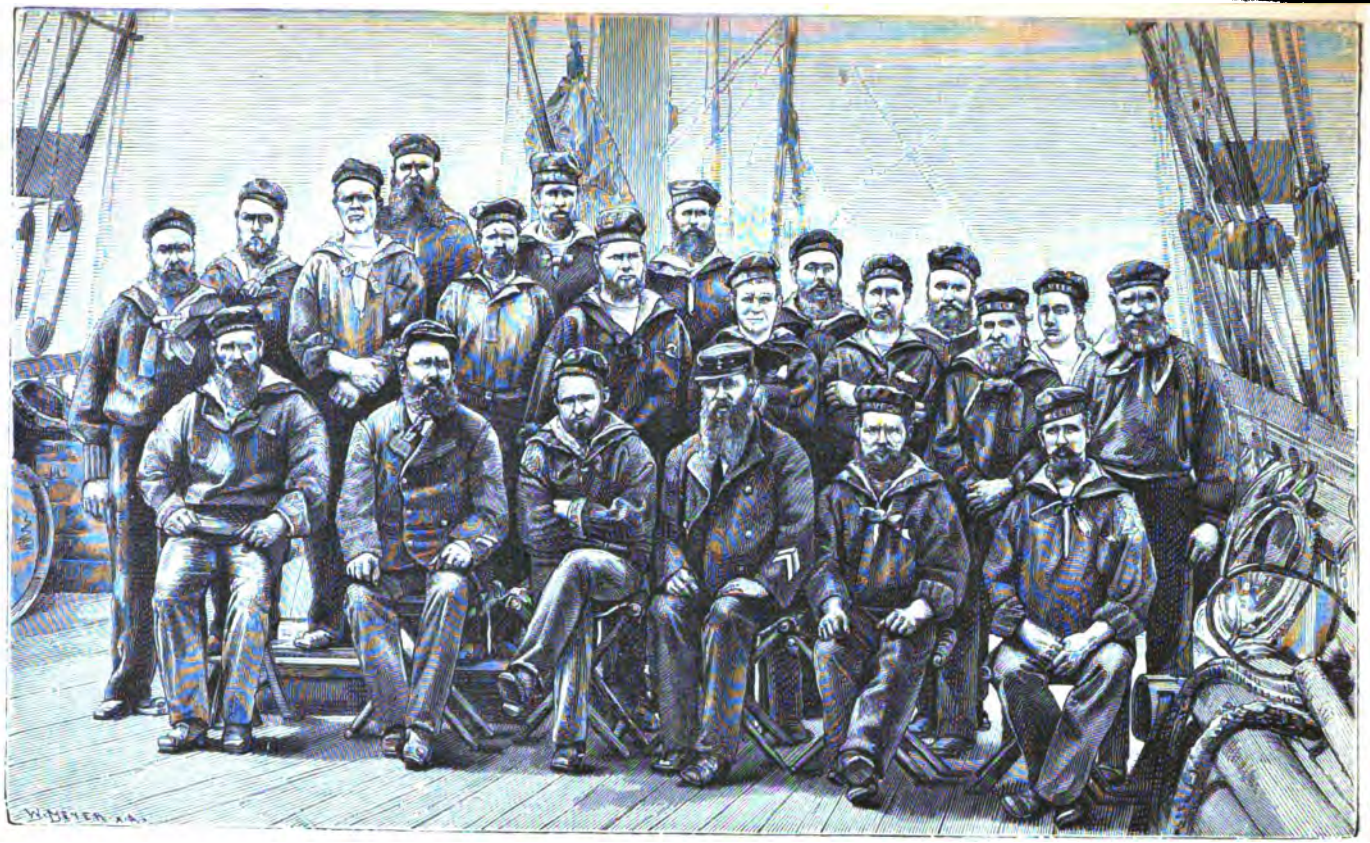
exhausted, but bringing with us memories which shall never pass away, we travelled the following day to Vlissingen, whither the *Vega* had gone from Falmouth, under the command of Brusewitz. We had been compelled to decline warm and hearty invitations to Holland and Belgium from want of time and strength to take part in any more festivities. The anchor was weighed immediately after we came on board, and the course shaped for Copenhagen. At noon on the 15th we passed Helsingborg, which was richly ornamented with flags for the occasion. Already at Kullaberg we had been met by the steamer *H. P. Prior*, with Lund students on board, and eight other steamers with deputations of welcome and enthusiasts for the voyage of the *Vega*, from Copenhagen, Malmö, Helsingborg, and Elsinore. The number of passengers was stated to be 1,500, including a number of ladies. Songs were sung, speeches made, fireworks let off, &c. At night we lay at anchor in the outer road of Copenhagen, so that it was not until the following forenoon that we steamed into the harbour, saluting the fort with nine shots of our little cannon, and saluted in turn by as many. While the *Vega* was sailing into the harbour, and after she had anchored, there came on board the Swedish Minister, Baron BECK-FRIIS, the Swedish consul-general EVERLÖF, the representatives of the University, of the merchants, and of the Geographical Society under the presidency of the former President of the Council, Count HOLSTEIN-HOLSTEINBORG, to bring us a welcome from the corporations they represented, and accompany us to the Toldbod, where we were received by the President-in-chief, the Presidents of the Communal Authority, and the Bourse, and the Swedish Unions of Copenhagen. We then drove through the festively ornamented city, saluted by resounding hurrahs, from a countless throng of human beings, to the Hôtel d'Angleterre, where apartments had been prepared for us. On the 17th a *fête* was given by the Geographical Society in the Casino Hall, which was attended by the King, the Crown Prince,

and Prince John of Glücksborg, and nearly all the distinguished men of Copenhagen in the fields of science, business, and politics. The speech of the *fête* was delivered by Professor ERSLEV. Thereafter a gay and lively banquet was given, at which the Crown Prince of Denmark presided.

The 18th April. Grand entertainment given by the King.—The 19th April. Magnificent banquet given by the Society of Merchants to the members of the *Vega* expedition at the Bourse, the rooms being richly ornamented with flowers and flags, and with busts and paintings executed for the occasion by eminent artists. Councillor of state MELCHIOR presided, and amongst those present, were observed the Crown Prince, the ministers, the speakers and vice-speakers of the *folke-* and *lands-ting*, and a number of the principal scientific and military men and officials. Speeches were delivered by the Crown Prince, State-councillor TEITGEN, Manager of the Great Northern Telegraph Company, Admiral BILLE, Professor MADVIG, State-councillor Melchior, &c. At another place, an entertainment was given at the same time to the crew. In the evening, *fête* of the Students' Union, the Swedish National Union, and the Norwegian Union.

I was obliged to decline an invitation to Lund, because his Majesty, King Oscar, had expressed the wish that we should first set foot on Swedish ground at the Palace of Stockholm.

It was settled that our entry into Stockholm should take place in the evening of the 24th April, but we started from Copenhagen as early as the night before the 20th in order to be sure that we would not, in consequence of head winds or other unforeseen hindrances, arrive too late for the festivities in the capital of Sweden. In consequence of this precaution we arrived at the archipelago of Stockholm as early as the 23rd, so that we were compelled during the night between the 23rd and 24th to lie still at Dalarö. Here we were met by Commander LAGERCRANTZ, who by the King's orders brought our families on the steamer *Sköldmön* to meet us.



THE CREW OF THE "VEGA."
After a photograph taken at Naples.

On the 24th at 8 A.M. the *Vega* again weighed anchor in order to steam on slowly, past Vaxholm into Stockholm. We met innumerable flag-decked steamers by the way, fully laden with friends, known and unknown, who with shouts of rejoicing welcomed the *Vega* men home. The nearer we came to Stockholm, the greater became the number of steamers, that, arranged in a double line and headed by the *Vega*, slowly approached the harbour. Lanterns in variegated colours were lighted on the vessels, fireworks were let off, and the roar of cannon mingled with the loud hurrahs of thousands of spectators. After being greeted at Kastelholmen with one salute more the *Vega* anchored in the stream in Stockholm at 10 P.M.

The queen of the Mälar had clothed herself for the occasion in a festive dress of incomparable splendour. The city was illuminated, the buildings round the harbour being in the first rank. Specially had the King done everything to make the reception of the *Vega* expedition, which he had so warmly cherished from the first moment, as magnificent as possible. The whole of the Royal Palace was radiant with a sea of lights and flames, and was ornamented with symbols and ciphers in which the name of the youngest sailor on the *Vega* was not omitted.

An estrade had been erected from Logaorden to the landing-place. Here we were received by the town councillors, whose president, the Governor, welcomed us in a short speech; we were then conducted to the Palace, where, in the presence of her Majesty the Queen of Sweden, the members of the Royal House, the highest officials of the State and Court, &c., we were in the grandest manner welcomed in the name of the fatherland by the King of Sweden, who at the same time conferred upon us further marks of his favour and goodwill.[1] It

[1] Among others to all who took part in the Expedition a *Vega* medal, specially struck, to be worn on a blue-yellow riband on the breast. It may

was also at the Royal Palace that the series of festivities commenced with a grand gala dinner, on the 25th of April, at which the King in a few magnanimous words praised the exploit of the *Vega*. Then *fête* followed *fête* for several weeks.

On the 26th the Swedish Yacht Club gave an entertainment in the Grand Hotel under the presidency of Admiral Lagercrantz. Among those who were present may be mentioned his Majesty the King, the Crown Prince, Prince Oscar, Oscar Dickson, and Baron von Otter, Minister of Marine. On the evening of the same day there was a torchlight procession by pupils of the Technical High School. On the 27th there was a gala-play, to which all the *Vega* men were invited. On the 28th at a festive meeting of the Academy of the Sciences, a medal struck on account of the *Vega* expedition was distributed, the meeting being followed by a dinner given at the Hotel Phœnix by the Academy under the presidency of the Crown Prince. On the 30th April and 5th May banquets were given by the Publicist Club, and by the Idun Society, by the Naval Officers' Society to the officers of the *Vega*, and by the Stockholm Workman's Union to the crew. On the 7th and 8th May there were festivities at Upsala, the principal attraction of which consisted of gay, lively, and ingenious carnival representations, in which we received jocular addresses and homage from fantastically dressed representatives of the peoples of different countries and periods.

During this time there were daily received deputations

perhaps be of interest for numismatists to know that the medals distributed on account of the *Vega* expedition are to be found delineated in the eighth and ninth parts of the Swedish Family Journal for 1880. To those that are there delineated there have since been added a medal struck by the Finnish Society of Sciences, and the Anthropological-Geographical Society's medal.

THE ENTRANCE OF THE "VEGA" INTO STOCKHOLM ON THE 24TH APRIL, 1880.

addresses, and telegrams of welcome, among others from the *riksdag* of Sweden, the *storting* of Norway, and the principal towns of Norway and Finland, from the student corps at Upsala and Helsingborg, from the St. Petersburg Geographical Society, from women in Northern Russia (the address accompanied by a laurel wreath in silver), &c. In a word, the Stockholm *fêtes* formed the climax of the remarkable triumphal procession from Japan to Stockholm, which stands unique in the history of festivities. Even after the Expedition was broken up in Stockholm, and the *Vega* had sailed on the 9th May for Karlskrona and Gothenburg, where she was again taken over by the whaling company that previously owned her, the *fêtes* were repeated at these towns. They commenced anew when the *Vega* exhibition was opened with appropriate solemnities by His Majesty the King in one of the wings of the Royal Palace, and when some months after I visited Berlin, St. Petersburg, and my old dear fatherland, Finland.

But I may not weary my reader with more notes of festivities. It is my wish yet once again to offer my comrades' and my own thanks for all the honours conferred upon us both in foreign lands and in the Scandinavian North. And in conclusion I wish to express the hope that the way in which the accounts of the successful voyage of the *Vega* have been received in all countries will give encouragement to new campaigns in the service of research, until the natural history of the Siberian Polar Sea be completely investigated and till the veil that still conceals the enormous areas of land and sea at the north and south poles be completely removed, until man at last knows at least the main features of the whole of the planet which has been assigned him as a dwelling-place in the depths of the universe.

Hearty thanks last of all to my companions during the voyage of the *Vega;* to her distinguished commander Louis

Palander, her scientific men and officers, her petty officers and crew. Without their courage and the devotion they showed to the task that lay before us, the problem of the North-East Passage would perhaps still be waiting for its solution.

THE NEW YORK PUBLIC LIBRARY
REFERENCE DEPARTMENT

This book is under no circumstances to be taken from the Building

Form 410